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INOCULATION IN PLEURO-PNEUMONIA.

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DURING the past months Pleuro-pneumonia has been rife. In many parts of the country it has made its appearance. Some knowing the value of inoculation have had recourse to it, and have reaped the benefit: the attention of others is arrested, they are inquiring into the matter; while others, again, still stand aloof; they do not believe in the efficacy of the operation, they are not convinced that when rightly performed it will certainly check and prevent the spread of the disease.

In these circumstances, a brief account of a few "Outbreaks" treated under "the Act" and by inoculation may be of some little service.

(A) On 8th October, 1878, as one of the inspectors of this county (Mid-Lothian), I was called to the farm of B——. I found fifty-two animals—Ayrshires, crosses, and some Shorthorns —dairy stock. One cow was pointed out to me as having recovered from the disease, the carcase of another lay ready for burial, while in different parts of the byres or cowhouses were four cows, plainly the subjects of the Lung Plague.

Pleuro-pneumonia had previously existed in these premises on three occasions—once before the passing of the Act, and twice under its operation,—April to August, 1870, and April to July, 1872,—with very lingering and fatal effects. Seeing the severity of this outbreak, I at once, to save loss to himself and expense to the Local Authority, strongly advised the owner to send for Mr. Rutherford and give inoculation a full and fair trial.

Next morning, with the aid of the thermometer, Mr. Rutherford easily added seven other animals to the affected list. We slaughtered two, and with lymph obtained from them two bulls and thirty-seven cows, including five freshly put in (foreign cows)

were without delay inoculated. Most of the diseased animals were ordered to be slaughtered, a few, however, being left as test cases. Five calves and a fat cow were sent by "float" to Edinburgh slaughterhouse. By the 26th October all the diseased animals, sixteen in number, had been slaughtered, and there the outbreak practically ended. A few healthy animals, from a distant part of the farm, were added to the stock, and inoculated as they came in. No more cases occurred. The disease, instead of lingering about the place, as on former occasions, for *three or four months*, was got rid of in less than *three weeks*, leaving upwards of forty animals apparently free from disease. Pleuro-pneumonia has not, to my knowledge, existed at B—— for the last eight years.

The casualties under Mr. Rutherford's care were trifling. Some of the cowhouses were cold and draughty; frost and snow lay on the ground for a considerable time, yet only one little foreign cow went down with Paralysis and partial Gangrene of the tail. Another Ayrshire going amiss about the joints and spine was disposed of. These were the only fatal cases. A biggish swelling on one cow's haunch, and a few rather short sore tails, soon healed. The premises were reported free from disease on 26th December, fifty-six days from the slaughter of the last case.

(B) The farm of K——, well known throughout the district as frequently the seat of Lung Disease; often had it run its bitter course there. During the prevalence of Rinderpest, we remember an attack of Pleuro-pneumonia reducing the stock to eight or ten. Everything was done in the way of cleansing, fumigating, and disinfecting; but no sooner were fresh cows added than it reappeared. From April to November, 1876, too, under the Act, the disease smouldered and lingered, causing heavy loss and inconvenience to the owner and a heavy bill to the Local Authority.

February 1st, 1879, thirty-six cows, Shorthorns and a few Ayrshires, dairy animals; one cow affected and slaughtered. March 2nd, four others attacked; two of these slaughtered, and from them thirty-one cows inoculated by Mr. Rutherford. The third diseased animal was ordered to be slaughtered; the fourth kept for a week as a test case. On March 17th this test case and two others diseased had been put out of the way, and the outbreak ended, leaving twenty-eight animals apparently free from disease; the restrictions were removed from the premises towards the end of May.

Casualties.—One cow amiss about knees and spine, slaughtered; one crooked tail, an abscess on udder, and lymph swellings on two or three haunches, soon healed, and the farm of K—— has not since (seven years ago) been troubled by Pleuro-pneumonia.

From June to September, with lymph obtained from Mr. Rutherford, I inoculated nineteen cows as bought in, adopting here the systematic amputation of the tail a little above the swelling, and the immediate application of the actual cautery as in the docking of horses. This I found preferable to the dipping of the tails three times a day in carbolic acid and water; and the process was soon after adopted by Mr. Rutherford as a part of his system. These nineteen cows caused so little trouble to the attendants that they became careless, and one day I found a nice draught from an open window playing on a black cow's back and a wet bed under her. The almost certain result followed—loss of power of the extremities, necessitating slaughter, though this tail, like the others, had healed.

(C) Dairy premises at S——, built a few years ago, hitherto free from Lung Disease; clean, well kept. April 29th, 1884, seventeen cows: one affected and slaughtered, the remaining sixteen inoculated by Mr. Rutherford.

May 24th: One cow that had been ailing and isolated for a few days, slaughtered. Outbreak ended.

Casualties.—One cow dead, apparently from the operation, but *post-mortem* examination showed disease in the chest; one sore tail, and a slough at its root which healed; thirteen other animals scarcely inconvenienced, save by the loss of a good few tips of tails.

(D) Some premises at C——. May 8th, 1885: Thirty-two cows, about half English cows and the others Ayrshires. One affected and slaughtered.

May 29th: Two affected and slaughtered. From them twenty-eight cows inoculated by myself. One of these with a temperature a little above 103°, and another picked out by the thermometer, $104\frac{4}{5}$°, and operated on next day—test cases and to clear the premises. The latter, probably, was a mild case of the disease. She was isolated for a few days, and returned to her stall among the others. The inoculation did not take with her. A bit of thread would have produced as much effect; but she recovered. The 103° cow, on the other hand, did well enough for three weeks; the inoculation seemed to take mildly, then suddenly a swelling appeared on the tail at the vulva, it rapidly increased and spread, taking anus, vulva, and haunch in its embrace, and in about ten days, in spite of all we could do, the cow died. *Post-mortem* examination revealing a big swollen mass in one of her lungs, not unlike, in some aspects, the swelling at the tail, but *none* of the marbled characteristics of Pleuro-pneumonia Epizoötica. The remaining twenty-seven cows gave me no trouble whatever, save the usual docking of the tips of most of the tails. They all did well. The "free report" was

sent in towards the end of August, and the premises C and D, though now filled with fresh cows not inoculated, have for more than fifteen months had no recurrence of the disease.

(E) March 16th, 1885: Thirty-six animals, mostly English cows. Dairy established at G—— about a dozen years ago. Clean, well-kept premises; no Pleuro-pneumonia before. In fact, so little did the owner know of the malady that he kept two Shorthorn cows till the last stage; sent one to the abattoir; there the disease was recognised, and my information as inspector came through the police. Remaining cow, on above date, ordered to be slaughtered. On March 23rd another cow affected and slaughtered, and from her I inoculated twenty-seven cows, leaving a roan Shorthorn cow, 105°, and a light-coloured Ayrshire a little over 103°, undone. The result was very satisfactory. Two or three fat cows were sent, as a measure of precaution, to immediate slaughter. The twenty-seven inoculated stood good, and were saved; the roan shorthorn recovered, was operated on afterward, the effect being a suppurating tail, but no inoculation. The light-coloured Ayrshire, not operated on, went out, a month after the date of the operation on the others, a thorough bad case of Pleuro-pneumonia—these two test cases standing always beside the other cows. No casualties here to speak of; one tail two inches long, another twelve inches, and a lymph swelling on one's haunch, which all soon healed, was the sum. No deaths, nor paralysis, nor bad joints. The outbreak was put an end to. The premises were cleared on or about June 19th.

The sequel to this case is interesting. About two months after the beginning of the first outbreak the owner bought four calving-cows, and placed them in an adjoining field. So soon as the restrictions were removed, these cows were tied up in the house in which no diseased animal or test cases had been. Some fat cows inoculated were sold out, and ten other fresh cows were brought in and placed in the same house; fourteen animals not inoculated being thus added to the stock. Disease, meanwhile, broke out in the adjoining premises H and J, and six of these unprotected cows in E had to be sent out with Pleuro-pneumonia last week, before proper lymph could be got for them. The restrictions are again on the place; the remaining eight cows are inoculated, while those inoculated at first have stood fat, healthy, and well alongside of six bad cases of the disease.

(F) Buildings erected a few years ago. No Pleuro-pneumonia before. Well-constructed, well-kept premises, with a good stock of dairy cows, forty-two in number, twenty of them big English cows, the remainder Ayrshires and crosses. The owner is brother to the owner of E, and, like him, sent a bad case to slaughterhouse

without knowing it. Not really believing, however, that his cow had Contagious Pleuro-pneumonia, he declined to have his cows inoculated at first when his brother's stock was done. All went well with him for three weeks, but on the fourth week, ending April 17th, 1886, I sent six of his cows by "float" to Edinburgh Slaughterhouse, thorough bad cases of Pleuro-pneumonia, inoculating then thirty-three of those remaining, two fat healthy cows being sent to immediate slaughter. The result of the operation was simply that thirty-two cows were saved. No Pleuro-pneumonia occurred among them, though the thirty-third cow proved a test case of the first water. On April the 15th, when going over the cows with the thermometer, the temperature of this cow was found to be $103\frac{3}{5}°$. A cross was clipped on her haunch with scissors, and another made on the wall behind her, to mark her as a "suspicious" animal, though to outward appearance the cow seemed well enough. Inoculation "took" very severely with her, the tail requiring amputation about eight inches from its root. The cow became unhealthy-looking, there was evidently disease in the chest, though all the usual symptoms of Pleuro-pneumonia were not present. About the third week she took a turn for the better, then relapsed, and was killed on May 15th. *Post-mortem* examination showed the pleura around the pericardium and heart, the mediastinum, the surface of the lung, etc., one mass of tubercle; the organs were sent to me as free from Pleuro-pneumonia, but a simple incision through one of the lungs showed at once the true "marbled," solidified, almost dried up appearances of an old case of the Lung Plague. This cow had been allowed, certainly unwittingly, to stand for one month in the midst of nineteen other big, fine, inoculated Shorthorn cows, and within a few yards of thirteen other cows, also inoculated, and yet not another case of Pleuro-pneumonia occurred among them; the premises were "declared free" about July the 20th. We had no casualties from the operation, save one very short caudal appendage, another about a foot long, and an abscess of no consequence on one's haunch. Absolutely no other bad effects on the thirty-two animals. They ate, and fed, and throve; though the inoculation was firm, only two or three tails escaping docking about six or eight inches from their tips.

(G) Old farm-steading, about three-quarters of a mile from E and F, straw-thatched roof, but good cow-house. Owner warned of the existence of Pleuro-pneumonia near him. Had his cows examined by his veterinary surgeon; got a good report, and shortly afterward sent two cows to auction sale, one of which was seized and condemned in Glasgow.

April 15th, 1886, twenty-three cows, English and Ayrshire, two

bad, sent to slaughter; seventeen cows at once inoculated, one with high temperature, and three calvers left, but inoculated afterwards. Result: eighteen cows saved. The one with high temperature and another proved true cases; another with swollen knees and a bad udder before the operation was also disposed of. No casualty, except a thick sloughing tail, which the docking shears easily did away with; the others did well. Premises towards end of July declared free.

Inoculated cows have since been sold out of F, and eighteen fresh uninoculated animals put in, also three fresh cows into G. Yet at present to all appearance, everything is right and sound.

(H) Small dairy closely adjoining E, only a wall between them. Two Ayrshires, four foreigners, one calf. One foreign cow severely affected and killed; one with high temperature and one to calve not operated on. Result: four cows saved, the calf slaughtered. Paralysis of hind quarters in one foreign cow, and Pleuro-pneumonia appearances on *post-mortem* examination of her lungs—the young calving cow not inoculated, a victim to the disease. Premises cleared sixty days afterwards. Remaining cows have stood with only the wall between them, and the six recent cases in E, unaffected.

(I) Small dairy—ten cows at L——, a mile and a-half from H; (outbreak caused apparently by a lately-purchased cow)—a bad case—slaughtered May 4th of present year; nine cows inoculated—outbreak checked at once and permanently. No bad effects, save one old black cow amiss about the joints, though some of the animals were standing almost in water, and doors and windows, and almost a roof had to be improvised for the place.

(J) Dairy, closely too, adjoining E. Owner declined to have his cows operated on at first; kept a cow and sold her, apparently not knowing she was a bad case till she was slaughtered—the County Court and a fine.

June 29th, 1886.—Eighteen dairy cows of the usual class, their temperature that evening nearly normal, 101° to 102°, only one reaching 103°. July 6th, two affected cases—one slaughtered. The difference in the temperature of the animals is very marked, only one being normal $101\frac{2}{5}°$, the others ranging from $102\frac{2}{5}°$ to $103\frac{4}{5}$. The evening was very warm and sultry, and risking high temperature, etc. I inoculated sixteen cows, sending the affected case to immediate slaughter. The result proved the thermometer right, four of the animals turning out bad cases of Pleuro within twenty-one days from the date of the operation; the others did well. No accident of any kind, save the one usual—short thick tail, or rather a remnant of it. Twelve cows are standing now perfectly well and thriving, and milking and eating. The premises fall to be reported free to-morrow (18th September).

Remarks.—In some number shortly may be, with permission, a few remarks on these cases. In the meantime, we would simply state that the dates and figures are taken from our "Blue and Red Books of Forms." Copies are in the hands of the Veterinary Department of the Privy Council, and of the Local Authority of the County of Edinburgh; their accuracy can easily be tested. The places where the outbreaks occurred are within a radius of four miles—the majority within two miles of this place. The names and addresses of the owners are for obvious reasons not given here, but, with their consent, the premises and many of the animals can be examined. The work is not that of a specialist, or of an inoculator on a large scale, but simply that of an ordinary country practitioner who has seen Mr. Rutherford's system in full operation, has seen the care and unremitting attention and watchfulness that gentleman bestows on it, and has seen, too, its surprising and beneficial effects,—Simply the work of one who, in the course of ordinary practice, has met ten outbreaks by the system and on the lines laid down and shown by Mr. Rutherford—adding to them the hot iron, and has met with the same satisfactory and good results. If any one will analyse even these ten outbreaks, he will find that, either in company with Mr. Rutherford or by ourselves, we have gone into premises long and often affected—into others new to its influence—into clean, well-kept places, and to cold, damp, dirty quarters—to severe as to mild attacks, and among all kinds of dairy cows, with test cases and without test cases, with the same results. To use Mr. Rutherford's words, "the back-bone of the disease has been broken," and the outbreak stamped out within, *in every instance, three weeks of the date of the inoculation.*

Will any one, without inoculation, tread in the same footsteps? Will he go to Case A, with sixteen diseased cows standing beside forty others? will he slaughter twelve bad cases and leave four others for a week and two for a fortnight? and will he without inoculation stamp out that outbreak at once and save almost all the forty cows? Or to Case F, and kill six diseased animals, and leave for a month one even worse than they among thirty-two others, and laugh at the end of the "fifty-six days," not having lost a cow?

For ten years at least the inoculation note has been sounding in this part of the country with no uncertain sound. How many have listened? How many members of the profession at the present moment really know inoculation, and can truly and rightly practise it? How many, from their own personal knowledge and practical experience, are competent to pass an opinion on its merits? Outbreaks there have been in plenty; sceptics by the score. How many, laying their prejudices aside, have quietly sent for Mr. Rutherford and given inoculation, as practised by him, "a full and fair trial"?

How many, reading and hearing all that Mr. Rutherford has said and written and done, have taken on themselves the *rôle* of inoculators on their own account—some successfully and some with "glycerine lymph," and lymph two years old, and mild inoculation and earnest efforts to save the tips of the tail, and some with scant acknowledgment of the source of their information and the origin of their practice?

"Honour to whom honour is due." To Mr. Rutherford undoubtedly belongs the honour of introducing into Scotland, and making popular, the only right and true method of inoculation as a preventive and check to the ravages of Contagious Pleuro-pneumonia.

That the cradle of this method was Australia and New Zealand, that inoculation was practised there with a fair measure of success even twenty or twenty-five years ago, seems evident; but it appears to have been a ruder and rougher process, giving in some careful hands very favourable issues, and in other instances negative, and very often disastrous, results.

To Mr. Rutherford is certainly due the credit of reducing the process to a system, of greatly improving it, of giving it a really scientific footing, producing a method which moves with almost mathematical precision to its desired end—the eradication and prevention of Contagious Pleuro-pneumonia at the least possible loss and in the shortest possible time.

Let our students study inoculation; let practitioners all over the country make themselves masters of its details and experts in its practice. Let Local Authorities take the matter up; it will well repay them. And when all our veterinary surgeons can perform, and perform rightly, and carry out the process to its conclusion, then let inoculation be made compulsory. Give the owner a little licence to put in, under proper surveillance, a few cows to make good his losses, and ensure that these, too, are inoculated; and in return for this kindness keep the restrictions hanging over him in a formal manner, and make certain that every cow that has stood in an infected place goes straight (when removed) to the slaughter-house, or from the nearest sale-yard to the nearest abattoir.

Something akin to these views we are glad to learn is now entertained by some veterinary advisers to the authorities. We trust that before long they will be incorporated into the working of the Contagious Diseases (Animals) Act.

DERMATITIS CONTAGIOSA PUSTULOSA.

BY RICHARD W. BURKE, V.S., A.V.D., STATION VETERINARY HOSPITAL, CAWNPORE.

UNDER the above heading Friedberger and Fröhner (*Lehrbuch der Speciellen Pathologie und Therapie der Hausthiere*, 1886) describe what veterinary surgeons in England and in America have long been accustomed to call Equine Variola. In 1883 I witnessed this disease in a number of artillery horses then under my veterinary charge, and termed it Contagious Impetigo of the horse, a short description of which appeared in my Annual Veterinary Report of 1883, and also in the VETERINARY JOURNAL of the following year. Schindelka (*Oesterr. Vierteljahrsschr.*, 1883, *S.* 61. 9) proposes the same designation.

As specially characteristic of this disease, I may mention the peculiar characters of the scab, which appears glued on to the part, and when shed leaves a clean, bare, even patch, which heals without desquamation.

In the typical form of the disease the eruptions are usually discrete, are superficially seated on the epidermal layer and malphigian bodies, and seldom penetrate the subcutaneous connective tissue, except as a complication and in aggravated cases only. The vesicles are pearly white at first, are not much raised above the skin, and contain a clear serosity, which may become purulent in the latter stages and in many aggravated cases.

It may be doubted whether pus formation is more nearly related to this disease, or to its complications. At any rate, its absence in many cases closely watched, would point to the latter. And, lastly, I recognize in this disease a shorter duration than that belonging to Horse-pox.

Contagious Impetigo runs its course in from two to three weeks—generally only two weeks in typical cases—without complications, which is also unattended by any constitutional disorder of any kind, such as one always meets with in the course of general diseases, as the variolæ, etc.

Unlike Variola this is a purely local disease, unattended by fever, and amenable to local treatment.

The usual seats of the eruptions are the limbs and body. In the enzoöty of 1883 alluded to by me, the majority of cases presented the lesions on the extremities, only two cases being noticed on the body, and a third the subject of experimental inoculation.

This disease was first described in man by Dr. Tilbury Fox, under the name Impetigo Contagiosa. To English-speaking veterinarians I introduced the disease under this name through my Annual Veterinary Report of 1883, and the VETERINARY JOURNAL,

1884. Simultaneously with my observations, Schindelka brought the disease to the notice of German veterinary surgeons under a similar designation. Professors Dieckerhoff and Grawitz term it Acne Contagiosa (*Virchow's Archiv*, 1885, 102 *Bd.*, *S.* 148). In its clinical features it has many points, however, which contrast, rather than assimilate it with Acne, as it is ordinarily termed.

Its contagium is believed to be a bacillus, which is described by Dieckerhoff and Grawitz as being somewhat longer than a Tubercle bacillus.

An average case, if properly treated, is cured in about four weeks, according to Dieckerhoff and Grawitz; but this is not the experience of most German veterinarians, Schindelka, and myself. It is only when complications arise that the disease is prolonged to over three weeks, average cases generally terminating only in *two* weeks. The worst cases (of those I consider typical of the disease) were discharged from hospital cured within twenty-one days: and this, I believe, is the experience also of most veterinarians on the disease as seen in Germany.

THE PATHOLOGY OF NAVICULAR DISEASE.

BY FRED SMITH, ARMY VETERINARY SURGEON.

(Continued from page 166.)

The bone is often found studded with calcareous deposits identical in appearance with those we described as existing in the cartilage.

When we make a section of the ulcerated navicular bone, we find much the same changes as above described, only they are more intense; there is considerable blood-staining around the ulcer, great absorption of the compact layer which abuts on it, and we may find lodged in the ulcer portions of fibres of the perforans tendon which have grown into it, and become firmly united to the walls of the cavity. This condition is infrequent. The depth of the ulcer is usually not great; I have seen one specimen where it nearly penetrated the bone, but this is very rare.

Before proceeding to the microscopic changes which occur in the bursa, I am anxious to make myself clearly understood with regard to what I recognise as an abnormal appearance in the bone, tendon, or cartilage; when an ulcer exists, there are no two opinions respecting the presence of disease; but I have endeavoured to show that an ulcer is not by any means a frequent accompaniment. I recognise as Navicular Disease, the slightest brown-staining of the fibro-cartilage or tendon, one speck of calcareous deposit in either bone or cartilage, the least erosion of the perforans tendon, the most partial absorption of the fibro-cartilage, the most

distinct congestion of the cancellated portion of the bone, and the slightest purple colour of the compact layer; such slight changes, I am convinced, are the primary ones of Navicular Disease.

The microscopical changes may be studied as those affecting the bone or cartilage, and those occurring in the tendon.

In the bone, the chief changes occur in the blood-vessels; these become enlagred, particularly those described in the normal histology as forming a plexus in that portion of the bone adjacent to the cartilage. The enlargement or dilatation of these vessels is very marked; shortly, they increase not only in size, but in number, and by so doing exert great pressure on the surrounding bony material, so that absorption or breaking down of it occurs. We then find the vessels gorged with blood cells, giving a perfectly black

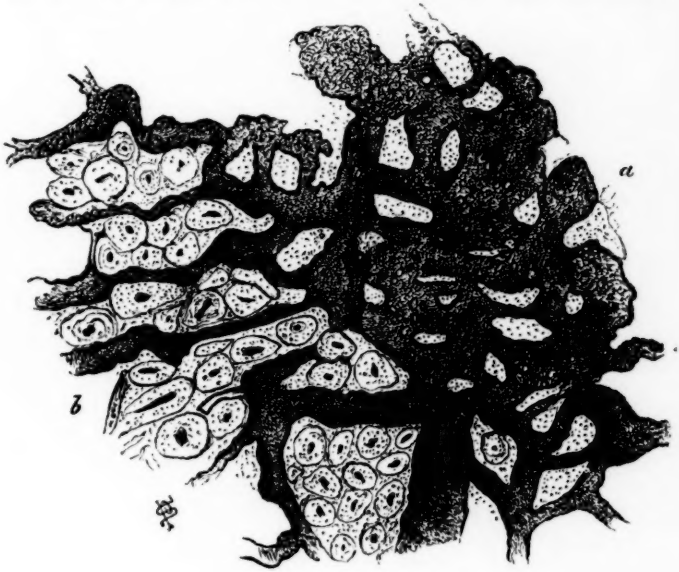

Fig. 3.

PORTION OF NAVICULAR BONE OPPOSITE TO AN ULCER IN THE CARTILAGE.

The black mass to the right, *a*, is made up entirely of dilated blood-vessels gorged with corpuscles. The white places in this black mass are small islands of bony tissue, which have not yet disappeared under the pressure.

At the deeper-seated part of the bone, to the left of the figure, at *b*, we find the blood-vessels also enlarged, but a large quantity of bony material still remains here, though in course of time it will be isolated into islands and absorbed by pressure. At the bottom of the figure, a large island, made up of thirteen concentric Haversian systems, is being pressed out of existence.

appearance in parts under the microscope; the enlargement of the vessels is irregular, being large in some parts and narrow in others, even in the same blood-vessel. Between the vessels may be seen portions of bony material which have not yet been removed by the surrounding pressure; these in course of time disappear, when nothing but the large collection of blood-vessels can be seen. The bone tissue has now dissolved, its place occupied by vessels which readily break down; the part is therefore converted into an ulcer immediately a communication with the bursa is formed; in other words, caries has been brought about. This appearance above described of enlarged blood-vessels, with small intervening islands of bony tissue, is most characteristic. The field of the microscope is converted into a black or brownish mass of numerous and irregularly arranged blood-vessels.* We have

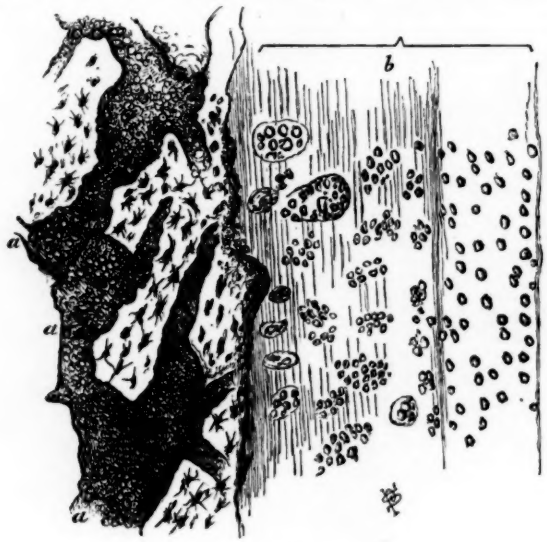

Fig. 4.

A Portion of the Navicular Bone and Fibro-Cartilage before any Destruction of Bone or Cartilage has occurred.

The changes in the bone are confined to enormous enlargement of the blood-vessels, *a*, *a*, *a*, which are gorged with corpuscles; large islands of bone are still left. The changes in the cartilage *b* are rapid multiplication and fatty degeneration of the cartilage cells.

The drawing illustrates clearly the commencement of Navicular Disease in the bone, viz., in the blood-vessels.

* The whole of these changes are shown in Figs. 3, 4, and 7.

described caries as not the most frequent condition of Navicular Disease. What is, therefore, the appearance of a bone unaffected with caries? Here, again, the changes are those in the blood-vessels; simple enlargement of existing ones, with slight rarefaction of the bone tissue. If there be depositions of calcareous matter on the surface of the bone, we will find that these are shown under the microscope as black patches, made up of rounded bodies also very dark, and between these small bodies the light shows through. These patches are in nests, and each nest contain an innumerable number of black cells. This black colouring is simply due to the light not being able to pass through them. If we allow a drop of HCl to run under the cover glass, the black nests and contents rapidly become

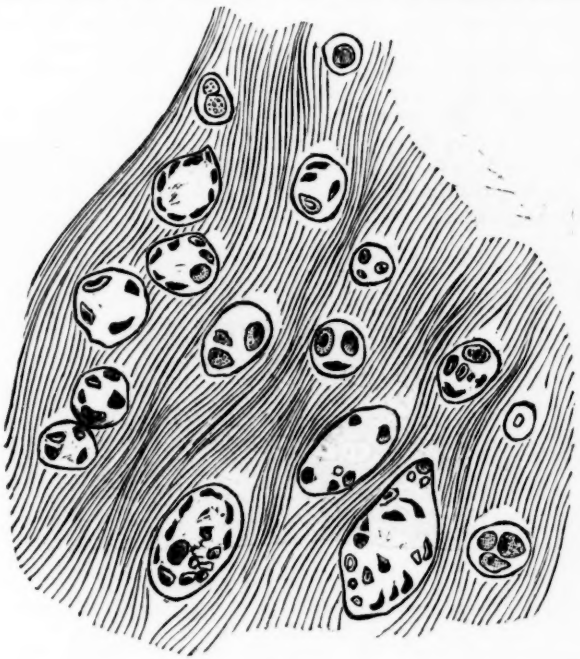

Fig. 5.

SECTION OF DEEP-SEATED PORTION OF NAVICULAR FIBRO-CARTILAGE AFFECTED WITH DISEASE.

The enlargement of the cartilage capsules and fatty degeneration of the cells are the marked changes. This section represents the appearance before ulceration has occurred.

clear, and the field becomes filled with bubbles; in other words, the masses consisting of carbonate of lime are dissolved with effervescence by hydrochloric acid. These masses of calcareous matter are derived from the normal calcified layer of cartilage, and are produced through irritation.

From the earliest commencement of changes in the nutrition of the bone, we have alterations taking place in the nutrition of the fibro-cartilage. In the deep layers of cartilage, viz., those next to the bone, we have enormous enlargement and multiplication of the cartilage cells. They are found in nests containing twelve, fifteen, or more cells; the latter are round, angular, or elongated, each cell is fatty; often they may be seen in process of division, and not uncommonly the capsule is broken through, and the cells distributed into the surrounding parts. As we proceed further outwards, the nests of cartilage cells are even larger, containing thirty or forty cells, which lie in close apposition; these are also fatty (see Figs. 4 and 5); towards the surface of the cartilage the cells are usually single or double, rarely in nests, distributed in the matrix, and very fatty (see Fig. 6). These cells exist in larger numbers than in the deeper-seated portion. I mean by this, that there is less matrix and more cellular elements, than in that part of the cartilage nearest to the bone.

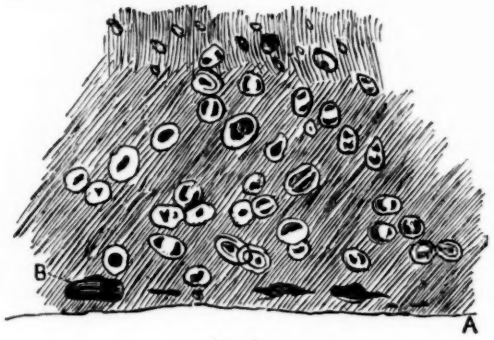

Fig. 6.

SECTION OF SUPERFICIAL LAYER OF NAVICULAR FIBRO-CARTILAGE AFFECTED WITH DISEASE.

a is the surface next to the perforans tendon; *b* are the brown bodies which produce the staining.

The multiplication, enlargement, and fatty degeneration of the cartilage cells are the chief changes.

The section represents the appearance before ulceration occurs.

We may often see these cartilage cells opening on the surface, and being thus discharged into the bursæ. The fatty condition

of the cells is most marked; comparatively large globules of fat occupying their interior. We may often find pigment of a brownish colour on the free edge of the cartilage; it is this which produces the brown-staining before described (see Fig. 6). I am very uncertain where this pigment is derived from, whether from minute capillary hæmorrhage in the eroded tendon, or from changes in the cartilage itself. I am inclined to the former opinion, as the pigment is only found in the superficial layer.

When the bone substance is destroyed, such as we have described, the cartilage immediately beneath it gives way, its nutrition (excessive as it is in the non-carious form of the disease) ceases, and the part becomes removed; thus a communication between the bursa and the internal part of the bone becomes established; on either side of this ulcer, above and below it,

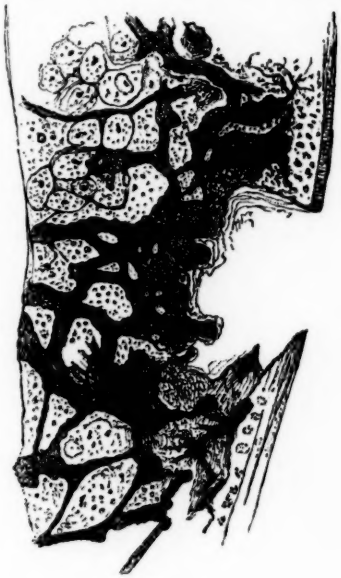

Fig. 7.

SECTION OF NAVICULAR BONE AND FIBRO-CARTILAGE AFFECTED WITH CARIES AND ULCERATION.

The most marked condition is the enlargement of the blood-vessels, forming big blackish-red patches around the carious part.

Small islands of bone can still be seen left; as they are absorbed, the ulcer extends deeper. The breaking down of the bone tissue by the enlargement of the blood-vessels is well seen.

the proliferation of fatty cartilage cells still continues. (See Fig. 7.)

When we have calcareous deposits in the cartilage, the part is in much the same condition as we described under the head of calcareous deposits in the bone. We have just the same nests or capsules of calcareous matter, containing the black (from trans-

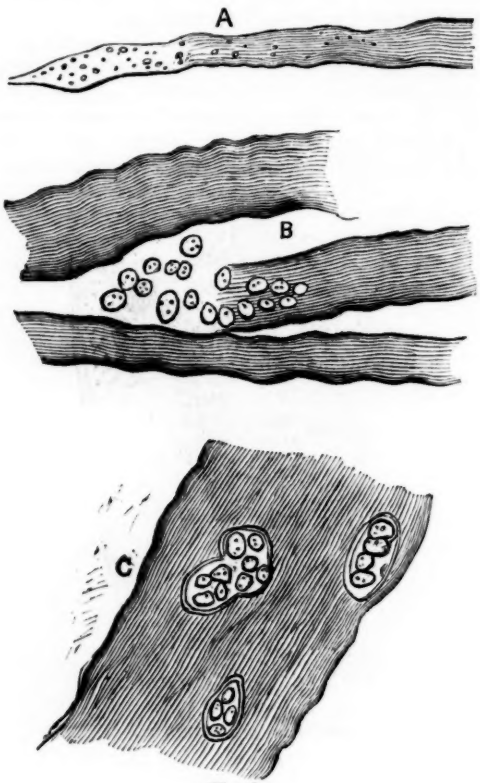

Fig. 8.

PORTIONS OF THE ERODED PERFORANS TENDON.

a, affected with fatty degeneration.
b, fatty cartilage cells lying amongst the fibres of the tendon.
c, capsules containing very fatty cells lying amongst the fibres.

mitted light), oval, or round contents of carbonate of lime, which dissolve entirely with effervescence under the action of HCl.

The matrix of the cartilage, in all forms of the disease, is fibrous-looking in parts, at others amorphous and dull.

The changes occurring in the perforans tendon are not less interesting. If we place a small fibre of the ragged tendon under the microscope, we find that the natural wavy markings have, in many cases, disappeared, and the place occupied by granular and fatty matter, which gives it a dull appearance; the outline of individual fibres is irregular and varicose, the tendon is in fact fatty, which we might naturally expect from the white gluey condition of the fibres (see Fig. 8, A). *Scattered through the fibres are large fatty cartilage cells*, presenting the usual appearance of rapid multiplication; they are derived undoubtedly from the friction of the tendon against the cartilaginous surface (see Fig. 8, B and C.) The varicose condition of the fibres spoken of above is often well seen; they may be found curled, nodulated, or twisted up into a mass. The brown-staining on the tendon shows itself as brownish pigment cells beneath the peritendonum.

In concluding this part of the subject I may say that I recognise three forms of Navicular Disease.

1st. Absorption and staining of the fibro-cartilage, with staining and erosion of the perforans tendon.

2nd. Absorption and staining of the fibro-cartilage, the bone studded with the millet-seed-like deposits of calcareous matter, with staining and erosion of the tendon.

3rd. Either or all the above, with ulceration of the cartilage, caries of the bone, staining and erosion of the tendon.

I believe that every case of Navicular Disease commences by changes in the nutrition of the bone, and that all other conditions are subsequent to this.

Although I recognise three forms of Navicular Disease, it must be clearly understood that I can only recognise them *post mortem*. I regard it as utterly impossible to say, during the life of the patient, what condition his bone, cartilage, and tendon is in; and I consider it impossible for this reason: *The intensity or duration of the lameness bears no proportion to the extent of the pathological changes which may have occurred.* A horse may be intensely and permanently lame, and remain in this condition for months, yet autopsy may only show dryness of the bursa, and erosion of the tendon, partial absorption of the fibro-cartilage, and the bone studded with minute calcareous deposits; a good example of this class of case is that of D 49, the history of which was previously described. Another horse may show great and permanent lameness, the symptoms in fact being identical with those just described, yet the pathological changes may be erosion of the tendon, ulceration of the cartilage, and caries of the bone, with none, or only one or two lime deposits. A good example of this class is that of G 51.

Intermittent lameness, with perhaps long or fairly long intervals of soundness, may be the chief symptoms of another class, and yet the *post-mortem* appearances may be identical with those shown by patients which remained constantly lame. Again, we may have Navicular Disease present in a foot, and yet have no decided lameness present. I have given the cases B 63, B 19, A 3, A 13, F 34, B 39, F 22, F 49, and D 55, as examples of this class. The *post-mortem* appearance of these cases is certainly more uniform than of any other group. It consists of erosion of the tendon, absorption of the fibro-cartilage, and calcareous deposits on the bone; other minor changes, such as brown-staining, dryness of the bursa, etc., are of course present. Of the nine cases above given I have only once found ulceration of the cartilage and caries of the bone; it was in the case of F 34, a horse, be it remembered, which, during many years' service, ***had never been lame.***

G 32 was a somewhat similar case of a young mare which, for about a year and a half, "pointed" the off fore foot persistently; she died of twist of the intestine, and I found Navicular Disease present; both the tendon and the cartilage were affected, but no caries. She was never lame; of this I am positive, for, suspecting Navicular for quite eighteen months, I used to examine her very regularly to see how she was going.

Neither the length of time an animal has been lame, nor the intensity of the lameness, bear any proportion to the pathological changes which have occurred. I have been surprised in examining the navicular bursæ of long-standing cases (two and a half to three years), to find so little change; I have been equally surprised in cases of only six months or so, to find what extensive changes have occurred; I have been more than surprised to find an amount of disease equal to the above in animals which have positively never been lame.

The causes operating to produce these differences are difficult to see. A great deal, I imagine, must depend upon the power the bone has of resisting inflammatory changes; while it progresses rapidly in one form, the bone being structurally weak, it takes a slow course in the other, from the resistance it experiences.

Of one thing I feel convinced, and it is this, that the calcareous deposits on the bone are the result of inflammatory changes; that it is an attempt to strengthen and not break down the bony material, and as far as my experience goes, *we never find caries of the bone where there is any large deposition of lime salts* on its surface.

We all know the hopelessness of treatment in arresting the progress of Navicular Disease. I will only say that I have tried all the usual remedies, and have only found them give temporary

relief. At one time I thought, that if it were possible to remove the friction of the perforans tendon from the navicular bone, that the inflamed surface might have a prospect of recovery. With this object in view, I performed tenotomy on the perforans; I destroyed the horse six months afterwards, but could not observe that the disease had been in any way arrested, and lameness was present up to the last.

I am very fond of the operation of neurotomy in well-selected cases, and I have performed it a very large number of times, with, as a rule, most gratifying results. Horses so operated upon will perform two or three more years' work. I have had an opportunity of examining several feet which I had originally unnerved, and have fancied that I observed in these cases that the disease appeared to have been checked somewhat in its progress. I am almost afraid to make this statement, as my evidence is so slender, but the impression made on me when examining these cases, *post mortem*, was that I should have expected the lesions present to have been intensified in a foot possessed of sensation. Theoretically I should expect neurotomy to aggravate the disease.

I have not observed in all my neurotomy patients what I consider to be an arrest of the disease, for in one case (that of D 1) I found such extensive caries of the bone, that a fracture of it had occurred.

This article has grown to such proportions, that I am afraid of wearying the reader by the record of any more cases; but I may say that, in my search after disease of the navicular bursæ, in both diseased, and what were supposed to be healthy feet, I have come across much which was new and strange to me. The strangest of all things, however, was finding in a horse (G 55), that the navicular bone had been fractured or chipped at its lower edge, a piece about the size of a pea having been broken and re-united, and the only record of lameness against this horse was one lasting three days. He was a bad-tempered animal, and gave much trouble all his service, and I expect the fracture was done during one of his fits of temper, or run-away trips. This horse died of ruptured stomach. I never suspected anything wrong with the feet, they were simply dissected in ordinary course of investigation, when this singular condition was found. In the case of F 49, before detailed, I found an almost identical lesion.*

* Since the above was written I have dissected the foot of a horse which, during life, was dreadfully lame. I diagnosed Navicular Disease, and on making a *post-mortem* examination found the usual appearances of the second form of Navicular Disease, viz., absorption and staining of cartilage, millet-seed deposits on the bone, staining and erosion of tendon; no caries. The navicular bone was chipped at its lower edge (in exactly the same place as the above cases), about the size of a pea. It did not show until the cartilage shrunk through drying.—F. S.

I once found that a natural cure had been effected in Navicular Disease, by the perforans tendon completely growing into the ulcer in the bone.

After neurotomy I have observed in two cases (which worked for nearly three years) that the structures at the back of the pastern, and particularly in the hollow of the heel, commenced to give way. Careful dissection revealed that the reinforcing sheath of the perforans tendon had ruptured.

In offering to the profession several years' work at Navicular Disease, I do so in the hope that a more intimate knowledge of the minute changes which occur during its progress may be known.

I am not aware that the normal and pathological histology of the navicular bursa has ever before been described.

REMARKS ON SUBCUTANEOUS INJECTIONS.

BY E. E. BENNETT, F.R.C.V.S., A.V.D., ALDERSHOT.

THOSE agents which produce *local* effects, in contradistinction to general or constitutional, will be more especially considered.

(1) *Essence of Turpentine* (*Rectified*).—Injected in quantities of from two to four grammes, it produces immediate pain, which is shown by the uneasiness of the patient, and its efforts to bite the part. This period lasts a variable time, according to the temperament of the animal—say, from half an hour to two or three hours. Having passed off, we then notice a difficulty in its movements, together with the formation of "buttons," resembling large pimples. These latter unite, so that, after the lapse of ten or twelve hours, a large œdematous swelling is produced. Twenty-four hours after the injection this enlargement may be as big as a three-pound loaf of bread, and may go on increasing for the next two or three days —so much so that it may invade the whole aspect of one side of the abdomen or chest; the swelling, however, tends to gravitate. During this period it is hot and painful, and, later, commences to pit on pressure, the skin gradually being absorbed, so that, from the sixth to the tenth day, the abscess opens and gives exit to thick, usually yellow, purulent matter, together, very frequently, with portions of dead cellular tissue, according to the severity of the process.* Essence of turpentine, therefore, can be of great service, from its immediate, sure, and powerful action, without, however, blemishing in any way. It is so much the more valuable

* If one takes the precaution to use the rectified spirits of turpentine, to which is added a few drops of camphorated ether, engorgement results, without, however, the formation of an abscess or the same amount of suffering as when these precautions are omitted.

that it can be employed indifferently to all classes of animals. Its action is as certain in the ox (except, perhaps, in the dewlap) as in the horse, save that it takes three or four times the amount to produce the same effect, and, should the abscess show no tendency to burst spontaneously, it must be punctured to allow exit to its contents. The dose for a dog would be from a half to one gramme, according to its size; if employed for the pig, one must avoid injecting in those parts thickly clothed with fat.

The application of this substance as a revulsive can be variably made use of—*e.g.*, in chest affections, etc.; but notably in the treatment of long-standing lameness in the region of the shoulder-joint and hip is its employment indicated, a large proportion of such cases having been satisfactorily treated. One or two examples will be cited. The first has reference to a donkey which had been lame in the right shoulder for at least eighteen months, every possible means of treatment having been adopted without apparent success. Four injections of the essence were made at equal distances around the shoulder-joint, one gramme in each, and the animal left at liberty. On the morrow there appeared a hot, painful swelling, which increased in size up to the third day. At the end of the seventh day, slight fluctuation manifested itself at the seat of each injection, without, however, the formation of pus. The tumefaction subsided quickly, gravitating somewhat, and at the termination of a fortnight little or no puffiness remained. A month after, the lameness had disappeared, together with all traces of the application. Here is a case of inveterate lameness of eighteen months' duration cured by the injection of four grammes of turpentine in the comparatively short period of thirty days. The second case treats of an ox which had been lame for eight months, and which had also been treated in various ways. Here the lameness was located in the hip-joint. In like manner to the foregoing, four injections, of two grammes each, were made at equidistant spots around the articulation. Considerable tumefaction succeeded, but without running on to the formation of pus. A fortnight after the injection improvement was noticeable, and after the lapse of two months the lameness had completely passed off.

Should a single injection not produce the desired effect, a second, or third, even, may be tried after the action of the first has passed off, without causing any blemish to the skin covering the affected region. In certain cases, such as Pneumonia and adynamic diseases, a few drops of croton oil can be added very advantageously to the essence of turpentine.

Nitrate of Silver.—One of the drawbacks to the injection of turpentine is the consecutive pain, which is often a great annoyance to the patient, and renders its employment in certain regions rather

difficult—for example, in the vicinity of the eye in cases of Ophthalmia. A solution of nitrate of silver, one to twenty in water, and kept in a coloured bottle, does not offer the same objections. One or two grammes of this solution introduced immediately beneath the eye produces the following effects: Almost directly the animal commences to shake its head, which would appear to be caused by the sensation of cold occasioned by the solution; this, however, quickly passes off, and the subject begins to feed, without, apparently, feeling the slightest derangement. On the morrow a swelling arises, which invades the side of the head operated upon, and goes on increasing for two or three days; the appetite is not interfered with. Towards the fourth day the sub-dermal engorgement tends to localise itself, and at the point of injection there appears a fluctuation, which soon makes itself very evident, running on to the formation of an abscess about the size of an apple, which generally bursts from the fifth to the tenth day; pressure exerted gets rid of the purulent matter as formed, and soon after it dries up and leaves no trace whatever of the method of cure employed. Should the first injection not prove of benefit, a second or third may be attempted. This simple process often leads to a salutary derivation, which can be supplemented very advantageously by the ordinary treatment for Ophthalmia. Should a small tumour exist after the opening of the abscess, one must not hesitate to puncture, and by exerting a little pressure the encysted membrane of the abscess detaches itself and quickly comes away, and the wound healing, leaves little or no trace of the treatment.

Tincture of Iodine.—This substance in solution in water, in the proportion of one to two or three, is employed in the treatment of both long standing and recent lameness; the admixture of a small quantity of water hinders the formation of abscesses, which sometimes occurs when the pure tincture is used. Horses treated by injections of this liquid can continue to perform their work. The method, however, is inapplicable after the employment of such irritants as blisters, etc., for there is then a tendency to permanent induration of the part; the resolutive action is sometimes rather tardy in its effects, but the lameness—and this is the essential point—disappears within a comparatively short period. In strains of tendinous structures this method has been attended with beneficial effects; also in bursal enlargements, such as windgalls, etc., often determining their disappearance. It is advisable to inject the tincture as near as possible to the seat of injury, as thereby its action is enhanced; it is further of benefit in cases of shoulder lameness, and has been successfully employed in arresting engorgement in a case of snake-bite which occurred in a dog.

Biniodide of Mercury in the following solution has been injected

in cases of glandular swellings with success—*viz.*, biniodide of mercury half gramme, iodide of potassium one and a half gr., water twenty-eight grammes—and even at double this strength has been introduced beneath the skin, in the vicinity of articulations, without endangering them.

Chloroform has been employed subcutaneously in cases of lameness, to fix the diagnosis as it were—that is to say, if the injection is made near the seat of injury, the result would be to relieve the lameness for a brief period. This is a novel method of aiding practitioners in obscure cases, and deserves a trial.

The following description has reference to a new drug, termed, *Rèsorcine.*—Its physiological effects are, first, astringent in small doses; second, caustic in larger doses; third, disinfectant in its alkaline and neutral reactions; fourth, anæsthetic and anodyne. Besides these, it causes a perfect reconstruction of the normal tissues, without leaving any cicatrix—a valuable advantage, which no other caustic can lay claim to, and which makes it peculiarly adaptable to eye diseases.

An experiment made on a rabbit with the nitrate of silver and rèsorcine, each substance being used to cauterise the cornea, proved that, after the lapse of some few days, the eye which had been touched with the latter recovered its normal aspect, whereas the other presented a large cicatrix of cauterisation. Two cases of Traumatic Keratitis in the horse were cured within a fortnight. Its method of application is as follows: Wash the eye, and more especially the wound in the cornea, with a solution of one part to one hundred, and afterwards cauterise with an ointment composed of rèsorcine two (2) parts, fresh butter one part; after several applications the strength of the preparation may be reduced to one part to three. No cicatrix remains as a result of this treatment.

OBSERVATIONS ON SOUNDNESS.

BY R. H. DYER, M.R.C.V.S., LIMERICK.

(*Continued from page* 10.)

HAVING taken a hasty glance of the different structures met with in the course of our examination of the fore limb, it became necessary to direct attention to the foot. It would be superogatory to remind any of your readers that the examination of the pedal extremity is one of extraordinary interest. If my memory serves me, the late Professor Coleman found matter for *forty lectures*, or thereabouts, when giving instruction to his class in the anatomy, physiology, and pathology of the foot of the horse. Whether the

knowledge the learned professor possessed of the subject was all that was required is not for me to venture an opinion upon, but I may be permitted to state that, even at the present day, much has to be learnt with reference to the physiology of certain parts of the foot.

Most of the diseases likely to meet the eye of an examiner have been remarked upon, in a somewhat cursory manner, it must be confessed; yet sufficient has been said to direct the attention of those more competent to treat the subject than I am in that branch of our profession, which has been so much neglected.

Similar marks of unsoundness are sometimes present between the fetlock and the coronet as have been described as found between the knee and fetlock, and which renders it unnecessary to dwell upon, sufficient having been said of the one to answer for the other. We, however, may just mention, *en passant*, that at the anterior part of the fetlock a bulging or enlargement is frequently seen, which occasions some alarm. This will arise from one of several causes. In one case it is analogous to a tumefied bursa, and in another it will be caused by disease of the bone; but whatever the nature of the swelling may happen to be, it is caused by injury from without. Horses with upright pasterns are liable to it most especially, although horses with legs and joints of every shape and form are obnoxious to it also. These enlargements are often produced in the hunting-field. Jumping a wall or a rail, going too close to the fence, will likewise be a certain source of accident; indeed, I know of no surer way than this to produce the injury. Horses addicted to pawing in the stable will injure their joints in a like manner; but of all things, going too close to timber or stone walls in the flying or buck-jump is the most frequent.

When we take into consideration the weight of a horse and its rider, the impetus with which the animal goes to a fence, the peculiar position of the soft and hard parts of the limbs, the fact of these soft parts being drawn, as it were, tightly over the bones when the limb is doubled up, we need not be surprised at injury being the result of a knock under such circumstances. The same remark will apply to the knee. People often wonder at seeing their horses with *big knees* the morning after a hunt. They cannot imagine how a slight *tip*, as they are pleased to call it, should so disfigure the leg. They do not take into consideration the position of the joint, the speed of the horse, and the texture and low state of organisation of the integument at that particular part. If they knew all this, they would no longer wonder, especially so when we remember that the fence is made of unyielding material.

In these observations I have not mentioned anything with respect to *peculiar marks* sometimes seen midway between the knee and fetlock, as between the joint and the foot. I allude to scars left after the operation of neurotomy, because these scars will receive some attention in another place.

In pursuing our scrutiny towards the hoof, we usually spend a little time in ascertaining the state of surrounding parts. They should feel elastic to the touch; not, as is too often the case, as hard and unyielding as a piece of dried gutta-percha. When this latter state exists, we frequently find the animal with stilty or rough action. The diseases met with at this part of our examination are Ringbone, Ossified Cartilage, False Quarter, Sand-crack, Sore Heels, Treads, and Over-reaches. Ringbone is occasionally met with in horses submitted for an opinion as to soundness. This ailment is one of considerable importance. It is found to vary a good deal as to its consequences, depending upon the exact situation of the abnormal deposit. It is occasionally seen that Ringbone exists without interfering with the usefulness of the animal; but, as a general rule, the reverse is the case, especially when situated in the fore limbs. There are cases brought for our opinion which are found to be slightly lame, and, with all our acuteness, we are not able to account for it or to point to the cause; and we are sorely vexed, inasmuch as we are expected, like newspaper editors, to know everything. A few weeks, or, perhaps, a few days, will bring to light the hidden cause of lameness, which presents itself in the shape of an exostosis near the pedal extremity, so deeply situated as to occupy a spot below the coronary ligament, which eventually grows upwards, and becomes what is known as Ringbone.

This term is not a happy one, nor is it a correct term to make use of, as we seldom find the exostosis surrounding the part like a ring; it is more frequently met with in two or more separate or distinct parts. Ringbone is thought less of when situated on the hind feet than when on the foremost, and much less if *both* are affected. Horsemen declare that if both are diseased (hind ones), the animals will travel more easily than when lame only of one. This is true, and so it is with most other lamenesses. The *screw-dealer* is aware of this, and fails not to make both feet suffer alike by tightening the shoe of the sound foot, by which the action is rendered *even*, although shorter. The unwary are in this manner deceived. They are made to believe, if mention is made of the shortness of action or stride, that it is the *natural* one of the horse in question, and the purchase is generally effected after this assurance.

Action, although much is known about it, is, in my opinion, not

thoroughly understood—certainly not by the mass of horsemen. I dare say most persons who are in the habit of riding or driving animals would feel themselves insulted if told they did not understand what a horse's action should be. If we look into the streets or the hunting-field, we shall learn that every animal has its own peculiar gait or action in the various paces; hence arises the difficulty in making persons believe that this or that horse has imperfect action, and that that imperfection arises not infrequently from diseased bones. But so it is. This subject will be referred to again in another place.

I have thrown out a hint to the effect that impaired action may, and often is, referable to diseased bones, although the affection in each particular case is not always definable. If Ringbone has commenced immediately beneath the coronary ring, as it is sometimes known to do, it will not be an easy matter to diagnose it; time will be required to develop it.

Ossific deposits are always of the same character. I have found more of the earthy carbonates in some than in others. This fact will account for the easy and effectual manner that some are absorbed, no matter whether the deposit is situated upon the tarsi, metatarsi, metacarpi, suffragini, or coronæ. We are occasionally told of the wonderful cures made by *skilful* men in the country—that is to say, the men who live as farm-servants, and know a little—or, as some persons think, a good deal—about medicine. Many a time I have heard that So-and-so could take off a splint or a spavin in less than no time. Doubtless there are men of this class to be found, and they invariably obtain much credit for their cures; the failures, however, scarcely ever transpire. How different this is to the members of our profession! If we fail in one instance, the winds convey the evil tidings far and near; but if we make a hit, how quiet it is kept! It may cause slight consternation if it happens to be anything truly wonderful, but it is only of short duration.

(*To be continued.*)

ON THE VALUE OF OL. CARYOPHYLLI IN THE TREATMENT OF OPEN JOINT.

BY W. D. GUNN, M.R.C.V.S., A.V.D., RAWUL PINDI, INDIA.

THIS drug is brought to the notice of the readers of the VETERINARY JOURNAL with the hope that others will give the remedy a trial when occasions offer, and record their experiences. It is well known that many horses are destroyed annually in consequence of severe injury to joints, and from the inability to stay the flow of synovia. The eight cases which I have treated with

this preparation have terminated most satisfactorily. Of the eight cases there were three which, had they occurred before my acquaintance with the use of the oil of cloves for this purpose, would probably have been destroyed.

A description of two of the cases below will give an accurate idea of their severity.

No. 1 was a wheel horse in a battery of artillery, which had been kicked on the inside of the near hock. The horse was two days march from its destination, and had therefore to be taken on by train. On admission to the infirmary the patient was in great pain, which I endeavoured to relieve by anodynes. A constant stream of cold water was applied to the injury. The next day burnt alum was dusted over the open wound. This treatment was adopted for two days without any diminution in the flow of synovia. We were now able to erect a temporary scaffolding and slings, and I altered the treatment, using creosotum instead of calcined alum. On the third day after placing the patient in slings, the ropes broke, and the horse fell to the ground. The next morning I found the patient in great pain, and emaciated, and the synovia discharge profuse. The horse was again placed in the slings, the wound thoroughly cleansed, and with a camel's-hair brush I painted the lips of the injured surface with Ol. caryoph., a small piece of cotton-wool was also dabbed on, and the patient left. In the evening the treatment was repeated. On the second morning after the use of the clove oil, the discharge had much diminished. On the fourth day the synovia was but just recognisable, and, to my gratification, on the fifth day the synovial discharge entirely ceased. On the seventh day of this treatment the horse was taken out of the slings, and from that time rapidly improved, and is now doing his full share of work.

Since then I have had seven cases, all successful. The last, being a particularly severe one, occurred a few weeks ago. The horse was admitted into the infirmary, with broken knees of so severe a character that at each flexion of the joint the articulatory surfaces could be distinctly seen. The animal was immediately placed in slings, the wounds cleansed, and the oil of cloves applied to the surfaces by means of a feather, and a small piece of cotton-wool was dabbed on to the surface of the wound. Neither bandages nor splints were applied. The synovial discharge gradually ceased, and in twelve days the patient was taken out of the slings, given gentle walking exercise, and is now doing his ordinary work. The Ol. caryoph. seems to have an extraordinary stimulating property, which it exerts on muscular tissue.

I feel sure that those of my professional brethren who will give this new remedy a trial, will meet with most satisfactory results, and save many valuable animals, which would otherwise be destroyed.

Editorial.

CONTAGIOUS PLEURO-PNEUMONIA.

THE continued prevalence of this cattle scourge in the United Kingdom, after the efforts made and the severe measures enforced to get rid of it, is anything but satisfactory. It would be difficult to fix upon any special reasons for its persistency, or account for its appearance in the many centres in which it is reported as present. It is proving itself a much more troublesome malady to eradicate than Cattle Plague or Foot-and-mouth Disease, and it apparently bids defiance to the measures now in operation for combating it. Its insidiousness, uncertain and often protracted incubation, and the non-pronounced character of the earliest symptoms, especially to the uninitiated, doubtless make it a very formidable enemy to sanitary police measures, while it is a very serious and harassing one to agriculture.

Until the sources of infection are discovered and stifled, of course the disease will always be with us, and form an ever-present cause for alarm, not only in these islands, but also in those countries which receive cattle from us, as Canada, where, quite recently, fancy but infected stock from Scotland has compromised the safety of several valuable herds in the quarantine yards of Quebec, and perhaps even the farm stocks around that city. This grave danger calls for the most vigorous and rigorous action, and everything possible should be done to stamp out the contagion. The slaughtering of whole herds of cattle because one or two animals in them show symptoms of Lung Plague is a painful and costly process, which, though effective enough so far as the infected herds themselves are concerned, does not yet seem to bring us any nearer the final disappearance of the pest.

We have often drawn attention to protective inoculation for this malady, in the case of uninfected cattle in places where it has appeared, and we would now again refer to it in connection with the article on the subject from the pen of Mr. Cunningham, of Slateford, and which is inserted in our present issue. The careful and scientific manner in which the measure is carried out by Mr. Rutherford, of Edinburgh, seems to be followed by excellent results—so marked, indeed, are they as to convince very sceptical people of the real prophylactic value of inoculation in checking the spread of the disorder. The efficacy of the measure has never been thoroughly and publicly tested in this country, and the pole-axe having failed thus far, though it has been unsparingly employed on healthy as well as diseased cattle, surely the more scientific method applied to the still uncontaminated members of a herd should be tried and fairly judged, while the sick are dealt with by prompt slaughter. If inoculation will really protect, as we have long maintained it will when it is properly carried out, then the saving will be considerable, while veterinary science will be credited with affording an additional evidence of progressiveness; and our colonies in South Africa and Australasia, which have been infected with the disease by

our unclean exports, may be able to utilise the protective agency, as it is applied in Scotland, more profitably than they have hitherto, by their rude and crude method, been able to do.

THE VIRUS OF GLANDERS.

A VALUABLE communication has been made by M. Chauveau to the Académie des Sciences on the resistance of the virus of Glanders to the destructive agency of atmospheric air and heat, the investigations having been carried out by M. Cadéac and Malet. The authors endeavoured at first to discover the conditions that preserve and those that destroy the virus under ordinary circumstances. They have ascertained how long the virulence persists (1) in the humours dried more or less rapidly, and in the diseased lung left to the action of the atmosphere at different seasons of the year; (2) in humours placed in an atmosphere saturated with moisture at the ordinary temperature of the atmosphere; (3) in humours diffused through water. The resistance of the virus to desiccation varies with the rate of desiccation, with the temperature of the medium, and with its humidity. In the laboratory it was found that the virulence lasts two days, no matter what the season of the year, if the virus be exposed in thin layers in watch-glasses. In the external atmosphere, however, the virulence may be harmless on the third day or persist till the ninth; the former happens mostly in the summer or end of spring; the latter in the month of December. Meteorological observations show that a high temperature prevails and a dry state of the atmosphere in the former case, whereas in the latter the temperature is low and the air moist. Thorough desiccation of the virus means its destruction; the active virus always retains some of its moisture. If the virus be desiccated rapidly, as in a stove, at a temperature of 40°C., from one to twenty-four hours, its virulence lasts for a longer period than when desiccation takes place more slowly. Thus, a virus dried in the stove for two hours retained its activity for six days. It seems probable that this difference in the duration of the activity of the virus, when slowly and rapidly dried, is to be attributed to the more prolonged exposure to the atmospheric oxygen, rather than to any difference in the state of moisture of the environment. Fragments of Farcy buds from the lungs retain virulence in the central parts as long as twenty-four days, whilst the more external layers lose theirs at rates dependent on the facility with which they become desiccated in the atmosphere. An atmosphere saturated with moisture and at ordinary temperatures preserves the virulence of the morbid humours for very long periods of time—fifteen to thirty days. Boiling the virus for two minutes in water suffices to destroy its activity, but simply pouring boiling water on the morbid material does not destroy its virulence.

SYNOPSIS OF A PAPER ON HÆMOGLOBINURIA IN HORSES.

By DISTRICT VETERINARY SURGEON WINKLER.*

ONE of the most dreaded of morbid symptoms in horses is the excretion of hæmoglobin in urine.

During the last decennaries literature has been fairly rich in records of such occurrences, but it is found that the explanation of the symptoms presented,

* Translated from the "Deutsche Zeitschrift fur Thiermedecin und Vergleichende Pathologie," by F. Raymond, A.V.D.

as well as of the pathological changes, is full of glaring contradictions. I therefore propose contributing my small quota to the subject.

The greatest quantities of hæmoglobin are found in the muscles and blood cells. It can, therefore, only get into the serum in important quantities from the muscles and the blood cells, in case the ordinary excretory organs, the liver, spleen, etc., are insufficient to carry it off.

It is known that Hæmoglobinuria can be produced artificially by injecting large quantities of water into the blood, by transfusion of blood from another species of animal, and by certain poisons. There can be little doubt that such cases are brought about by wholesale disintegration of red blood cells.

Fleischer has reported that symptoms of Hæmoglobinuria can be produced by rapid continued running, proving that in such cases increased muscular decomposition is sufficient to throw so much free hæmoglobin into the circulation, that the organs concerned are not sufficient to excrete it in the ordinary way.

Such symptoms are not confined to equines. Saur reports a case in a dog, Vogel reports it during an outbreak of Sheep-pox, Dentler in Foot-and-mouth Disease, Utz noticed it in swine, Ruof in sheep. In man the complaint is well-known to English surgeons.

All the cases quoted above were of a sporadic nature, but there is an epizoötic form of Hæmoglobinuria in horses which is of particular interest to us, owing to the great losses it causes.

The etiology and pathology of this malady is, in my opinion, considerably obscured by the want of a proper division between its two forms.

I should like to divide the two forms into Rheumatic and Toxic Hæmoglobinuria. There is much in common between the two—for instance, the excretion of hæmoglobinous urine, muscular pain, etc., so that in many cases differential diagnosis is difficult; in other cases, however, the difference is easily perceptible

I give below the principal differences in symptoms and etiology.

Rheumatic Hæmoglobinuria only occurs from an intense chill after the animals have stood without work for a long time in a warm stable, on rich diet.	Hæmoglobinuria is accelerated by a chill, but may occur without it.
Rheumatic Hæmoglobinuria occurs in every locality.	Toxic Hæmoglobinuria is confined to certain regions.
Rheumatic Hæmoglobinuria occurs only in single cases.	Toxic Hæmoglobinuria ravages in some parts for months, epizoötically.
Rheumatic Hæmoglobinuria occurs without any premonitory symptoms.	Toxic Hæmoglobinuria often has premonitory symptoms; it is often introduced by severe colicky pains, followed by more or less paralysis of the hind quarters, increased pulse, and considerable appetite.
In the Rheumatic form, in severe cases the appetite is lessened, and often ceases.	In the Toxic form, the appetite not unfrequently remains until death.
The course of Rheumatic Hæmoglobinuria lasts several hours, even days, before terminating in death.	The Toxic form generally lasts a few days, but I know from experience, that it may only last a few minutes. Gierer reports that in his district it is called Apoplexy.

Hardly 50 per cent. attacked succumb to Rheumatic Hæmoglobinuria.

Hæmoglobin is never noticed in the urine before an outbreak of the Rheumatic form.

In the Rheumatic form Phlebotomy is followed by improvement, often by a cure.

If in the earlier period of an attack of the Rheumatic form the blood be drawn, and the clot separated, the serum remains unreddened. At a later period in the disease the serum is reddened, because it then contains hæmoglobin.

If a horse be destroyed at an early stage of the Rheumatic form, no pathological change is noticed as a rule, beyond slight sweating of some of the muscles.

In the Rheumatic form, decomposition of the carcase does not take place more rapidly than in that of healthy carcases.

Toxic Hæmoglobinuria carries off nearly 100 per cent.

Hæmoglobin is noticeable in the urine in Toxic form before other symptoms.

Phlebotomy invariably acts prejudicially upon the Toxic form.

In the Toxic form the serum is always reddened, because it contains hæmoglobin from the first.

If a horse dies, or is destroyed at an early stage of the Toxic form, it is noticed that in addition to the muscular changes, important swellings of the kidneys, and generally of the liver and spleen are found, as well as serous transudation into the peritoneal cavity, and tar-like blood.

Carcases of animals which have died of the Toxic form decompose with extraordinary rapidity, and spread a highly penetrating smell.

Although a list of differences between the two forms is given, it must not be concluded that a proper diagnosis is easy of attainment in every single case. It is particularly difficult to settle, when the veterinary surgeon is only called in later stages of the attack. But that there is a Toxic epizoötic form, different from the Rheumatic form, cannot be doubted.

I quote below some of the worst cases of an epizoötic which occurred in Mitterfel in 1868, and attacked twenty-seven horses.

A peasant came to me with the following report: "My two horses stood yesterday in the stable, and were perfectly healthy at evening feed, and ate their food with appetite. An hour later I found one dead. The other ate its morning feed, but was attacked an hour later with violent colicky pains. I believe my horses have been poisoned."

I went to the farm—about one-and-a-half hours' journey, and found the remaining horse apparently convalescent. I found it had a stiffness of the hind quarters, frequent irregular heart-beat, but no other symptoms; and a very good appetite. I may remark that the cardiac irregularity mentioned has often been noticed in the epizoötic form, but, strange to say, I find this symptom nowhere mentioned in veterinary literature. Eighteen hours later the animal was dead. *Post-mortem* showed all the pathological changes mentioned above.

Another case:—A jobmaster bought what appeared to be a perfectly healthy horse and brought it home.

For two days, owing to want of work, it stood in the stable; at the end of which the owner went to see the horse, and, watching it feeding with appetite, thought to himself that he had made a very profitable purchase. While he was yet watching the animal dropped, and after a few short struggles expired The horse was removed to the knacker's with its last bite of hay hanging from its mouth. *Post-mortem* revealed Toxic Hæmoglobinuria.

During this outbreak all horses attacked died.

Strange to say that, during a four years' residence in this district, I have seen no other outbreak, either before or since. My predecessor witnessed one during a two years' residence.

There must be quite specific causes for such an epizoötic outbreak; but we are still more or less in the dark on the subject.

The author concludes:—Rheumatic Hæmoglobinuria occurs in animals which have long stood in warm stalls, and have got into soft condition by high feeding, and then have been suddenly brought into stormy atmosphere.

Speaking upon the etiology of this form, he says:—It is a well-known physiological fact, that irritation of the sensitive temperature nerves of the skin causes reflex action on muscular decomposition and increases it.

The Toxic form must be looked upon as a muscular disease, and the cause in future be searched for in the muscular tissue.

The author continues:—I do not think preventive or curative means can be applied with effect until the cause of this destructive malady has been discovered. This will not be brought about until a differential diagnosis between this and the other forms of Hæmoglobinuria has been firmly established.

These lines have for their object to pave the way to such a goal.

THE ROYAL (DICK) VETERINARY COLLEGE.

OWING to the steady increase in the number of students attending this institution during recent years, says an Edinburgh newspaper, and to the extension and development of the methods of teaching, both hospital and class-room accommodation has gradually become inadequate. Three years ago the trustees reconstructed a section of the College property, which had previously been let as dwelling-houses, and converted it into class-rooms. This afforded a temporary relief, but it soon became evident that nothing short of a complete reconstruction of the then existing premises would suffice to provide the requisite accommodation. The original buildings stood upon a detached leasehold, having the form of a parallelogram. The buildings were arranged around a central open courtyard, the main entrance to which was off Clyde-street. The section of buildings fronting Clyde-street is of comparatively recent construction, and very substantially built. The outer walls of this portion are, therefore, to be allowed to remain, while the interior is to be entirely remodelled. The opposite end and the two sides of the parallelogram are to be re-built from the ground. In the case of the east and north sides this is already being carried out, and the new premises are to be ready for occupancy at the beginning of the ensuing session, while the remainder of the work will be taken in hand next spring. The plan of the remodelled premises was prepared by Mr. Morham, City Superintendent of Works, from an outline of the teaching requirements supplied by the professors of the College. It is intended that the new premises will, in respect of completeness and adaptation for teaching, occupy a foremost place among similar institutions. The main entrance to the new buildings is, as before, in the form of an archway, opening off Clyde-street. The ground floor to the left of the entrance comprises the Principal's office and waiting-rooms, while to the right of the entrance a house is provided for the janitor. The second storey on this side consists of the museum, which communicates with the pathological department at its west extremity, and with the anatomical rooms on the east. Over the museum are placed pathological and physiological laboratories and class-rooms for practical chemistry and practical microscope work in connection with the classes of physiology and

pathology. On the east side the ground floor is occupied mainly by stalls and loose boxes, but it comprises also a pharmacy-room, and an operation-room. The remaining buildings on this side are devoted to the anatomical department, and comprise the dissecting-room, a lecture theatre, macerating-room, professors' private work-room, etc. The dissecting-room is a very spacious apartment, after the design of the new dissecting-room in the Edinburgh University. It is lit entirely from the north, and is provided along one side with a gallery for the display of preserved preparations. A hoist will bring up the dissection subjects from the ground floor, and mechanical appliances will be provided for transporting them with ease to any part of the room. The floor of this room is of asphalte, and it is intended to coat the walls with enamel paint. The anatomical lecture theatre is seated for 150 students, and is in communication on either side with the dissecting-room, and with the museum. Entire subjects can thus be brought in from the dissecting-room in order to illustrate the lectures, and for the same purpose there will be every facility for utilising preserved preparations from the museum. The buildings on the north extremity comprise on the ground floor a shoeing forge, and hospital accommodation in the shape of dog kennels, stalls, and loose boxes. Over this, and forming the second storey, are a library and a gymnasium for the use of students; while the upper storey on this side forms part of a suite of rooms devoted to the chemical department. On the west side, the entire ground floor is occupied by stalls and loose-boxes, and over these are placed part of the suite of chemical rooms, a general lecture theatre, seated for 200 students, professors' private rooms, etc. The central court, from which access is obtained by staircases to various departments, is to be entirely roofed with glass; and a gallery will extend along one side of the court at the level of the first floor. The staircase at the north end of the court, which fronts the main entrance, will have the lower part in the form of an arcade, in the central niche of which will be placed the memorial statue of Professor Dick, the founder of the institution.

OBRERVATIONS ON THE EXAMINATION OF HORSES AS TO SOUNDNESS.

BY E. WALLIS HOARE, VETERINARY STUDENT, MONTREAL.

(*Continued from page* 187.)

Having examined the feet thoroughly, we have the shoes put on again; if all is found satisfactory, then we either certify the horse as being sound or not, or practically sound, and recommend him to our client.

Of course it is apparent to all that it is not possible to carry out all of this method in the fair or at the auction sale, but it is evident that any part left out will interfere with our giving a correct opinion.

Now, gentlemen, the description of the surest method of examining a horse as to soundness is completed. I hope it has not been too long and tiresome to you. If there are any omissions of important points, or opinions asserted which are not based on common-sense, you will confer a great favour by noticing them.

It is not necessary for you to inquire into the pathology of the diseases, as the paper is intended only to discuss what constitutes legal and practical soundness.

As regards warranty and certificates, I shall make no mention of them; to do so would require a paper to itself, as the laws and customs are so different in the various countries. For my part, I think that in a good many cases they could be dispensed with altogether. In Ireland they seldom make

use of warranty. Horses are bought on the recommendation of the veterinary surgeon, who protects the buyer by his sound advice and judgment ; hence the veterinary surgeon there requires to be both experienced in diseases and a first-class judge of horses.

This plan, too, appears to succeed well ; fever lawsuits are seen, and certainly there are as many good horses bought and sold there as in any part of the world. To have evidence of this fact, it is but necessary to read the reports of the great fairs of Carimee or Ballinasloe, or inquire of any person who has seen these splendid sights, he will tell you that he saw there a vast field of horses, and buyers from England and the Continent picking up what they require—hunters, hacks, carriage-horses, and chargers ; that there was little trouble about warranty, and that the veterinary surgeon there, who was a good examiner of horses and a first-class judge of them, was a lucky man, as far as reputation, popularity, and sovereigns went ; and what more could he desire ?

As Great Britain is essentially a sporting land and excellent country for horse-breeding, the veterinary surgeon there requires to be well experienced in the practical duties of his profession. He must be able to recognise a useful and well-made hunter or carriage-horse, etc., when required to do so. Such a man is sure to succeed, and be esteemed and popular with the public.

If he cannot do these, then he finds that, although he is very scientific and well up in the theory of his profession, still every-day practical routine work has yet to be learned.

Now, gentlemen, you will readily perceive that to be a competent examiner of horses, and to be trusted by the public in our advice, requires certain attainments which are not possessed by all who profess to be veterinary surgeons.

The first requisite is a knowledge of anatomy and the normal conformation of horses, not alone the routine anatomy as taught in the dissecting-room, but the external anatomy ; the normal feel to the hand of the different parts, their appearance to the eye, and the different points of the horse. Unless a thorough knowledge of the normal structure and the situation of parts is acquired, it is impossible to detect the abnormal.

The next requisite is practice in the art ; this duty is but one of the many which alone constant practice will teach. All our theory will help us but little unless it goes hand in hand with practice. Remember the old maxim, "An ounce of practice is worth a pound of theory," and in no case can this be better applied than in examining horses as to soundness.

You may read all the popular horse-books of the day, and ponder over what they say on the subject, or perhaps discuss the pathology of the numerous defects ; you may read Fearnly, Youatt, Stonehenge, and Sidney—you will find that they are like the popular books on horseback riding, hunting, or steeple-chasing : very nice indeed to read by the fire, or discuss with your friends over a soothing pipe and social glass ; but when you go at once to put this reading into practice in the hunting-field, and the course and pack and huntsman before you, the directions from the book of how to keep your seat, hold your reins, and guide your horse get mixed up, and you experience the very unpleasant sensation that somehow the book will not teach you how to ride across country, neither will it ever help you to pass the flag first in the steeple-chase course. And so it is in the examination of horses as to soundness ; the book will never make you competent to pass an opinion on a horse. You may know the minute pathology of the diseases constituting unsoundness ; perhaps you can discourse eloquently on the *pros* and *cons* as to whether Spavin is a bony tumour or an exostosis, or what its appearance would be under the microscope—these, no doubt, are very interesting, but

unless combined with practical experience in examining hocks, will go but a small way in advising your client as to whether the horse he proposes to buy has a spavined hock or not. Many other instances might be mentioned which go but to prove the necessity of practice in this part of the profession before venturing to give an opinion before the public.

Recollect that a mistake in the examination of horses is far more detrimental to the reputation of the veterinary surgeon than a mistake in diagnosing or treating disease. If he, through lack of experience, passes a horse sound, or recommends one to his client, and that horse soon afterwards is worthless from some glaring defect, it is a living monument of incompetence and carelessness, and soon goes round the district, ruining the veterinary surgeon's reputation—at least, as far as an examiner and judge of horses is concerned, and that in some places is a good deal.

Now, if he makes a mistake in diagnosing or treating disease, nobody is much the wiser, provided the animal gets well, and the public in general are not sufficiently versed in either diagnosis or disease to raise any objections ; while as regards examination of horses, a great proportion of the public can make a pretty good judgment themselves.

Another requisite is quickness in perception to detect at once departures from the normal state ; self-confidence is also necessary. Remember the words of Mayhew : "The veterinary surgeon is not permitted to doubt"; and true words they are, as doubt always means failure so far as horses are concerned.

If there is any doubt as to the soundness of a horse, never give him the benefit of it; it is better to reject him, though the dealer may grumble.

The veterinary surgeon must also conduct his examination in a systematic way, no faltering, undecided manner as if he were not sure of his capabilities, as going over the same ground more than once, etc.; such is soon perceived by horsemen, and dealers soon get to know the veterinary surgeon's weak point.

It is also necessary to act with confidence, and as a man well used to horses would do, and be prepared to mount and try the steed's paces if required ; to do this, do not dress up in morning or evening dress, but dress like a horseman, and be capable of testing the powers of a horse, whether as a weight-carrying hunter or a lady's hack.

Were the duties of our profession but to cure disease and decide what is legal unsoundness, then the work would be far simpler, but the public require more than this. Who is the best judge of the human athlete but the medical man, and his opinion alone is relied on for all advice concerning human nature as well as disease.

Then why should not the veterinary surgeon be just as well versed in the subject concerning his profession, and be the best authority on all matters connected with the horse. He should be able to advise the purchase of the coach-horse for the family carriage, the pony for the "hope of the family to ride," the quiet cob for the aged gentleman, the weight-carrying hunter for the sporting squire, the docile huntress for his lady, the steeple-chaser and racer for the turf, the brood-mare and stallion for the breeder, the general horse for the farmer, the draught-horse for the carrier, and the post-horse for the livery-stable.

Thus he must be a good judge of horses. This, as is well known, comes naturally to most persons whose taste have led them to choose the veterinary profession as a means of earning their living ; hence it is not surprising to find that all good practitioners are first-class judges of horses.

In proof of this, take the principals of all the colleges, and it will be found that they all had a love for horses, and their opinion on all matters connected with horses was always held in high esteem by the public. Few men will

join the veterinary profession and succeed, without a natural love for horses and all matters connected with them. Those who enter this profession as a last resource generally find their mistake.

Of course my remarks are intended to apply to those whose highest ambitions are to become clever and practical veterinary surgeons, whose services are sought for and esteemed by the public whether as to treating disease or giving an opinion on a horse as to his usefulness, value, and capabilities. These are the men who do honour to their profession, and when they have time on their hands they can soar higher and keep abreast with the scientist's theories.

In conclusion, gentlemen, considering the attainments which are required by the veterinary surgeon of the present day, the following quotation is applicable: "*Veterinarius nascitur non fit.*"

PASTEUR AND HIS WORK, FROM AN AGRICULTURAL AND VETERINARY POINT OF VIEW.

BY GEORGE FLEMING, LL.D., F.R.C.V.S., PRINCIPAL VETERINARY SURGEON OF THE ARMY.

(*Continued from page* 181.)

The antiquity of Anthrax is as great as its geographical extension is wide. It was one of the plagues with which the Egyptians were punished in the time of Moses, when there was a breaking forth of *blains* upon man, and upon beast, throughout all the land of Egypt—upon the horses, upon the asses, upon the camels, upon the oxen, and upon the sheep. Virgil, in his "Georgics," has depicted its deadliness and its contagiousness with the greatest accuracy, pointing out the dangers of the tainted fleeces of diseased sheep to mankind, as if he were describing the cause of what is now known as the "Woolsorters' Disease"—Anthrax conveyed to man by infected wool, and far from uncommon among people employed in woollen factories in this country. It frequently occurs in the histories of the Early and Middle Ages, as a devastating pestilence among animals, and through them as a plague of mankind. Our oldest Anglo-Saxon manuscripts contain many fantastic recipes, charms, and incantations for the prevention or cure of the "Blacon Blegene" (Black Blain), and the relief of the "elf-shot" creatures. From these up to our own times Anthrax has attracted more and more attention; even in this century, it has spread in some of its outbreaks over the whole of Europe, from Siberia to France.

The losses inflicted by Anthrax are appalling. Some idea of their extent may be derived from the fact that in one district of France alone, Beauce, it kills about 178,000 sheep, which (at only thirty francs a head) are worth 5,340,000 francs, or £213,600. In 1842, when sheep were much less valuable than now, the loss in the same district was estimated at 7,080,000 francs. The disease also prevails among sheep in Brie, Champagne, Berri, Poitou, Auvergne, Dauphiné, and Bourgogne. In the arrondissement of Chartres 17,800 perish from it every year; in Beauce 20 per cent. of the sheep die, a loss of seven or eight millions of francs annually. It is estimated that sheep to the value of twenty millions of francs are lost annually in France. Cattle, horses, and other creatures suffer also severely. In Russia the losses are enormous, especially among the horses and cattle. In 1837, in one district alone, 1,900 died of Anthrax; and in 1857, for the Russian Empire, it was reported that 100,000 horses had perished. In 1860, 13,104 cattle, out of 18,883 attacked with the "Jaswa," succumbed; and from the official report for 1864, it appears that in the five governments of St. Petersburg, Novgorod,

Olonetz, Tver, and Jaroslav, 10,000 animals died, most of them horses, few cattle, and still fewer sheep ; while 1,000 persons were infected and perished. From the 15th of January to the 27th of March, 1865, 47,000 cattle, 2,543 horses, and 57,844 other domesticated animals were lost in the governments of Minsk, Vitepsk, and Mohilev ; and in the government of Tobolsk, in June and July, 1874, there perished from the "Siberian Plague" (as Anthrax is sometimes designated) 4,735 horses, 516 cattle, 1,030 sheep, 52 pigs, 15 goats, and 106 human beings. In other European countries it is very prevalent and deadly, and in our own islands it causes heavy losses at times. In India it is witnessed in all animals, and as "Loodiana Disease" it is well known as a fatal scourge among military horses. In South Africa, as "Horse-sickness," it is most destructive, particularly in low-lying, damp regions, at a certain season of the year, when it kills nearly all the horses after only a few hours' illness.

The real cause of Anthrax was, until recently, involved in the greatest obscurity, and many influences were invoked to account for its appearance. But it may be noted that several Continental veterinarians, as Numann, Marchant, Gerlach, Plasse, and Delafond, were of opinion that it was of cryptogamic origin—the minute fungi finding entrance into the body with damaged grain or forage. The contagious nature of the disease had been known from the remotest antiquity.

In 1844, Delafond, then a teacher at the Alfort Veterinary School, was sent by the French Government to investigate the disease as it appears among sheep—known as the *Maladie du Sang*—in the districts where it was causing the heaviest losses. On examining the blood of diseased sheep microscopically, he observed peculiar rod-shaped bodies, but did not attach any importance to them. This fact has been lost sight of by nearly all recent writers on the malady. Pollender, a German, observed these bodies in 1849, Davaine and Rayer in 1850 ; and Brauell, of the Dorpat Veterinary School, in 1856 also noticed them. But these likewise did not realise the significance of their presence in the blood of Anthrax-stricken animals.

It was not until 1863 that Davaine, having had his attention once more drawn to these organisms in the blood by Pasteur's discovery of the butyric ferment, was led to examine whether they, if introduced into the blood of an animal, would also play the part of a ferment, as, if so, this would explain the rapid infection of the blood in an animal which had received into its veins, accidentally or experimentally, a certain quantity of this ferment. Inoculating sheep and rabbits with blood taken from a diseased sheep a few hours after death, he constantly found the organisms, which he named *Bacteria;* though when inoculated with blood from the infected animal before these rods were visible, and while it yet appeared in health, no effect was produced. "In the present state of science," wrote Davaine at this time, "no one would think about going beyond these corpuscles to seek for the agent of contagion. This agent is visible, palpable ; it is an organised being endowed with life, which is developed and propagated in the same manner as other living things. By its presence and its rapid multiplication in the blood it undoubtedly produces modifications in that fluid, after the manner of ferments, which speedily destroy the infected animal." This was the first direct evidence that a contagious disease is produced by a microscopic organism, and the discovery converted into a fact what was before only a hypothesis.

Davaine's announcement was not received without doubt and hesitation by some, and two experimentalists—MM. Jaillard and Deplat—were unsuccessful in arriving at the same results by experiment, and consequently sought to refute his conclusion. Paul Bert also opposed his view, and corroborated that of Jaillard and Deplat. "I can," he said, "destroy the bacteria in a

drop of blood by means of compressed oxygen, inoculate with it, and reproduce the disease and cause death without any appearance of bacteria. Therefore they are neither the cause nor the necessary effect of Splenic Fever. It is due to virus." And so the controversy went on."

At this time a young physician in Germany, Dr. Koch, began to study the Anthrax *bacilli* or *bacteria*, as they have been indifferently termed; though Cohn, another German investigator, was also at work in defining their morphology. Koch traced the life-history of the *Bacillus anthracis*, as it is now designated, and showed how widely it was distributed throughout the blood and organs, and especially the spleen of animals which had died from Anthrax; after many attempts he succeeded in growing, or "cultivating," the fungus artificially, and watching its development under the microscope: noting that the rods, like those of the butyric ferment, multiply by division, grow into long straight or twisted filaments, in which, in the course of time, if air is allowed free access, very minute oval spores are seen; then the filaments swell and burst, and the spores are set free. These spores, if introduced into the blood of an animal, or cultivated artificially, grow again into the characteristic bacilli, which eventually become the long filaments that form spores. Such is the life-cycle of this deadly microbe, which multiply so rapidly that the spores have been seen to germinate in three or four hours; and rodents—such as rabbits, guinea-pigs, or mice—when inoculated with the blood of an animal dead of Anthrax, or with the bacilli or spores of an artificial culture, perish usually in from twenty-four to forty-eight hours. The blood, which is dark-coloured, always contains these bacilli, as does the spleen, which is greatly enlarged, sometimes immensely so, and soft, like a bag of water; the urine, as well as the exudations thrown out during the life of the animals, likewise contains these bodies.

Pasteur possibly did not know of Koch's admirable researches, which were published in 1876; neither, probably, did the other disputants in France, for it was in that year that Bert gave an adverse opinion to that of Davaine. However this may be, Pasteur determined to settle the question as to whether Davaine or his opponents were in the right, and he adopted in his investigation the methods which had led him to such splendid results in his previous studies. He resolved to isolate the organism from infected blood, cultivate it, as Koch had done, in artificial media, and then to test its action upon animals. In this investigation he was assisted by M. Joubert, as, owing to his paralysis, he could not carry it on by himself.

In 1877, he reported to the Academy of Sciences that the bacilli were the only agents in producing Anthrax. A little drop of Splenic-fever blood sown in urine or in yeast-water, previously "sterilised" (rendered imputrescible by contact with air free from germs), in a few hours produces myriads of them; a drop of this first cultivation sown in a similar manner and with the same precautions, proves as fertile; and this process being repeated for ten or twenty times, it may be taken for certain that all the substances which the first drop of blood might have carried with it, have been completely got rid of. Yet Pasteur found that if a very small quantity of the final cultivation were injected beneath the skin of a rabbit or a sheep, it killed them in two or three days with all the symptoms of the natural disease. In order to satisfy himself and others that there was nothing else than the bacillus at work in producing this effect, he had his cultivation-fluids kept at an absolutely uniform temperature, which allowed the organisms to be deposited at the bottom of the tubes. When he inoculated with the clear upper fluid, or the deposit—the bacilli—he found that the latter alone caused disease and death.

But it was necessary to explain the discrepancy between the results obtained by himself and Davaine, and those of Jaillard and Deplat. These

latter had speedily killed rabbits with blood from a cow that had died of Splenic Fever, and their blood was also so virulent as to kill others, and yet no bacilli could be found in it ; while Bert maintained that he had destroyed the bacilli by compressed oxygen, and still the blood retained its virulence. It might be surmised that there were two kinds of destructive agents operating in this blood, and Pasteur had the good fortune to demonstrate that this was actually the case. Some years previously he had ascertained that in none of the tissues or fluids of the body, except in the intestinal canal, are there any germs ; that canal alone contains them, as they readily find access to it along with the food and water, and its temperature is favourable to their development. In the commencing portions of the intestine, in which there is air, ærobic microbes can exist ; but toward the terminal divisions oxygen is absent, and only anærobic microbes can live. During life the latter can do no harm, as the vitality of the lining membrane of the intestines prevents their passage through it ; but after death this resistance ceases, and the anærobic bodies then begin to exercise their decomposing influence, and carry on the process of putrefaction—penetrating into the tissues and the blood as soon as that has lost its oxygen. In Splenic Fever the blood is deprived of much of its oxygen during the course of the disease, so that, after death, decomposition is very rapid The germs or vibrions which most readily and rapidly pass to the blood after death are the septic or putrefactive, which cause the evolution of most fetid gases by their action upon nitrogenous and superfluous matters. So that after twelve or fifteen hours, the blood of a diseased animal, which, at the time of its death, and for a few hours after, contained only the bacillus of Anthrax, has now, in addition, the septic vibrio. The two are antagonistic, inasmuch as the Anthrax bacillus, being ærobic, soon perishes in blood destitute of oxygen ; while the septic, being anærobic, is, on the contrary, in the most favourable condition for development, and speedily invades all the fluids and solids of the body. From this circumstance it happens that if a drop of blood is taken from the body of an animal that has just died from Anthrax Fever, and is inoculated into a healthy animal before it has had time to putrefy, Anthrax Fever only will result. But if, on the contrary, the operation is performed after a longer time, when putrefaction has taken place in the blood, then inoculation will produce at one and the same time Splenic Fever and Septicæmia, or putridity of the blood, both being developed simultaneously, or one before the other, usually Septicæmia—the septic vibrio causing death before the Anthrax bacillus has had time to multiply in sufficient numbers to bring about such a result. This affords an explanation of the different conclusions arrived at by the experimentalists. Jaillard and Deplat had obtained blood which was more or less putrid, and therefore contained the vibrios of putrefaction mixed with the organisms of Splenic Fever ; it was therefore Septicæmia, and not Anthrax, which had killed the rabbits, and in examining their blood the septic vibrios had escaped notice, while no bacilli were observed. So that when Davaine asserted that these two opponents had not used pure Anthrax blood, he was right, though he could not give his reasons. Bert's apparently contradictory result was also accounted for in the same way ; he had employed blood which was more or less putrid, and as the spores of the septic vibrio perfectly resist the influence of compressed oxygen, these had not been killed, while the filaments of bacilli and septic vibrios had perished. The inoculated animals died from these spores. To prove that this was so, Pasteur resorted to the method of successive cultivation of them in an artificial medium, and in as perfect a vacuum as possible, or in contact with carbonic acid gas, but no air, as this kills them—conditions the opposite of those in which the Anthrax spores develop. From blood containing these two organisms of Anthrax Fever and Putrid Fever (Septicæmia),

he could produce either disease experimentally, at will, according as he cultivated the germs with or without air ; or by inoculating with blood from an animal just dead from the former malady, or obtained from it twenty-four hours after death.

These discoveries clearly established the correlation between the phenomena of fermentation and those of contagion. There is no longer anything mysterious about the latter. It is simply the breeding of a living organism, or "element," in a living body, and at the expense of that body, in the same way as the organism of fermentation lives and multiplies in, and at the expense of, the dead organic matters into which it has found its way. Just as the Contagious Itch, or "Mange," is produced on the surface of the skin by a very small insect or mite (the *Acarus scabei*), and "Ringworm," also contagious and situated on the skin, is due to a microscopic vegetable fungus (the *Tricophyton tonsurans*), so are what we may term the "internal contagious disorders," some of them comparatively mild, as Foot-and-mouth Disease, and others most fatal—as Anthrax, Cattle-plague, and Sheep-pox —due solely to living germs which prey upon the bodies of the animals they invade, and for whose fluids and tissues they each have a special predilection. I shall recur to this interesting feature presently. In the meantime it may be stated that the question as to whether contagious diseases ever arise spontaneously is settled in the negative : spontaneous contagious disease has no more foundation than the spontaneous generation of organised bodies ; and I need not discuss the primary origin of these diseases or the germs which occasion them, any more than I need do the origin of potatoes, turnips, dogs, or horses, when studying the attributes, derivation, or natural history of these or any other vegetable or animal body.

When studying Splenic Fever, Pasteur was struck by the fact that the microbe which causes it is under a particular influence which prevents it developing everywhere, and limits it to certain media which, one would think, do not differ from other media in any appreciable manner. Thus, in the ox, sheep, rabbit, guinea-pig, and some other creatures, it is readily inoculable and terribly fatal ; but the dog and pig have to be inoculated several times before they are infected, and even not then with certainty ; while fowls are proof against the disease. Why the latter should enjoy immunity when a large quantity of Anthrax blood was introduced into its body, and an ox would succumb to a minute quantity, was found to be owing to the fact that the microbe will not grow when subjected to a temperature of 112° Fahr. The temperature of birds being from 105° to 107°, Pasteur was of opinion that their blood was too warm for the germination of the microbe, which could take away the oxygen from the blood-globules with much more difficulty than from the air in artificial cultivations ; he therefore lowered the heat of the fowls, having previously inoculated them, by immersing their legs in water at 77°, when their temperature went down to 98° or 100°, and in twenty-four hours they were dead, their blood swarming with bacilli. To demonstrate still more forcibly that temperature was the cause of exemption in fowls, a hen, with its body heat reduced as in the other instance, after having been inoculated with Anthrax blood, became feverish, and when the Fever was at its height it was taken out of the water, wrapped in cotton wool, and placed in an oven at a temperature of 95° ; it gradually rallied, and in a few hours was well. Fowls killed after being rescued in this way, showed no trace of bacilli in their bodies. I have not heard that this method of saving fowls from the effects of Anthrax inoculation, by raising their temperature, has been tried in the case of people suffering from "Wool-sorters' Disease," or in that of animals affected with Anthrax ; but in the treatment of human Typhoid Fever, which is doubtless due to a microbe, good results have been reported from cooling the body of the patient by repeated baths in

cold water. This may be due to the diminished temperature more or less arresting the fermentation caused by the disease germs.

(*To be continued.*)

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(*Continued from page* 215.)

The PRESIDENT next called upon Professor Pritchard to read his essay on "A few hints respecting Breeding."

GENTLEMEN,—The subject I have chosen for this thesis is one having a very large amount of matter for our consideration; indeed, replete with import sufficient for, instead of one, a number of papers. I may, therefore, at once tell you that many of its divisions, and those, too, unquestionably of a weighty character, will not be even alluded to by me, and others, perhaps, of equal value only casually touched upon. In a word, I shall confine myself mainly to such points in connection with the breeding of horses, respecting which the agriculturist, I think, has a right to learn something from us as members of the veterinary profession. Any one who can, at the present time, say or do anything which can in the slightest degree enhance the position of the agriculturist, will be simply doing his duty to his country; and although, probably, my effort to-day will bear but little fruit, I may be the means of provoking a discussion, either in this room or out of it—a discussion which I earnestly invite—from which some benefit may accrue.

Firstly, for, in my opinion, the whole matter hangs upon this, Can the breeding of horses be profitably carried out in this country? I am firmly of opinion it can if it be done in a scientific and proper manner; indeed, I look upon it as a neglected source of profit. There are several inducements—really inducements—at the present time to the breeder of horses, by which he might not only recoup his outlay, but also make a substantial sum above and beyond it. The demand for good horses of all breeds never was so great as at the present time, and this demand must of a necessity remain for many years. The prices realized for first-class horses never were higher, and this, for the same reason, must also remain for years. It is no argument that, because there are a large number of bad, unsound, and misshapen animals—sadly too many—to be found, and that they are a drug in the market.

This fact is due to badly mating sires and dams, improper rearing, and the general treatment of the young stock—in a word, bad management—and it should cause those who essay to breed to think whether these bad results cannot be to a great extent avoided. Good management has succeeded in the improvement of the breeds of our oxen, our sheep, and our pigs; aye, and it has, in many persons' hands, in our horses too. There are other inducements for breeding high-class horses, not least of such, the large sums of money now annually given away in prizes at agricultural shows throughout the country, together with the opportunities afforded by such meetings to bring the breeders' names and horses prominently before the public—an advantage of no slight value.

In the selection of dams and sires, never lose sight of the influence which is well known both will have upon the progeny. "Like produces like" is one of Nature's great laws. The colour, shape, size, health, and even the temperament of the foals depend, to no slight extent, upon the parents; and it is very frequently indeed the case that physical and intellectual

peculiarities, identical with those noticed in the grandam or grandsire, or even more remote parentage, will exhibit themselves. I am, however, inclined to the opinion that unsoundness is short-lived if proper selection be carefully carried out, compared with the physical or intellectual capabilities. Many persons have expressed opinions as to which of the parents hands down the corporeal power, and which the mental capability, or whether the dam or sire has special influence with either. I do not hold any opinion with an iron grip regarding the matter, but I certainly am inclined to the one that the foal is mainly indebted to the sire for the physical power (more markedly so in a colt), and to the dam for the mental.

Numerous instances, of course, have been cited for and against this opinion, but I base it mainly upon what I think will prove to be a fact if looked into, viz., that bad-tempered sires do not, as a rule, reproduce their vicious habits in their stock, and that the mares do; while big-framed, heavy, skeleton horses prove to be more adapted to getting animals of corresponding physique than similar mares bring forth. I would further suggest that, if possible, more care be observed in selecting a horse for a virgin mare than subsequently, for I fully believe that the first impregnation of the womb has an impression upon it which frequently lasts for some considerable period, if not for the remainder of the animal's life. Almost every one knows what a wonderful effect this has in some animals—take the bitch for an example—and that the same thing applies to the mare to a considerable, if not to so marked an extent. Allow me to mention the instance of the thoroughbred mare which was covered for the first time by a zebra at the Zoological Gardens in London. She threw a striped foal, and several times subsequently, although covered by a thoroughbred horse, she also threw striped foals.

Before quitting this part of the subject, the influence of the parents upon the faculties of the progeny, I may mention another instance, which will, perhaps, be interesting. It was narrated to me only a short time since by my friend and colleague on the Examining Board, Mr. John Roalfe Cox. The case was a mare that was suffering so badly from "navicular disease" of one fore-limb that she was almost constantly, when standing, resting her leg in a decidedly bent position. She was put to the horse, became in foal, and brought forth a filly having the corresponding leg bent in a similar form from a shortened condition of the flexor tendons. The mare was covered a second time, proved to be in foal, and an exactly similar deformity appeared again. I should be unthankful to Mr. Cox for kindly narrating this interesting case to me, if I did not add that the first foal was operated upon by him, and recovered so completely as to be able to win several good races, among others, if my memory serves me rightly, the Goodwood Stakes.

This brings me to what I consider to be one of the principal points of my paper, viz., if it is necessary to be particular in the selection of dams and sires to secure size, form, bone, colour, stamina, and temperament, which I think is undeniable, how much more must it be necessary to select, to ensure soundness of limbs and health of constitution. A horse may be perfect in symmetry, and possess what is commonly termed good quality, but, to the careful breeder, of what use is he for stud purposes if he has "spavins" in his hocks or "sidebones" in his feet? The mare may possess fine temper and great jumping powers, but who would, on carefully reasoning, breed from her if she were a "whistler" or had "cataracts" in her eyes? And yet what has been a common practice up to the last few years, and even now exists to too great an extent? Why, the mare is worked until she is worn out; and having been "a good old sort," she is put to the horse without the slightest consideration as to whether she is the victim of some hereditary disease certain to be handed down to her offspring, which is sure to render such offspring an unprofitable article. I am of opinion that Spavin, Splint, and Ringbone,

Sidebones, Navicular disease, Curb, Cataract, and Roaring and Whistling, are all hereditary maladies, which should most certainly be carefully avoided in the selection of dams and sires, and perchance there are others which should be added to the list. I do not expect, however carefully the selection may be made, that these diseases will be eradicated; but I am convinced that such a policy will considerably reduce the number of the cases. As a proof of this, let me tell you that, when acting as veterinary referee at the Cart-horse Society's first show—I think it was in 1879—so many of the animals were rejected for Sidebones that the judges' awards had almost continuously to be altered, and frequently a very moderate-looking but healthy animal was placed in front of the better-looking but diseased one. What was the case at the last show of the same Society? Why, among those animals absolutely sent in competition for prizes a sidebone was a rarity. I know some will advance another reason for this, but I feel convinced that it is nearly entirely due to breeding from healthy dams and sires. Take another example. For one case of Cataract we see at the present day, we used thirty years ago to meet with twenty, or even more than that. Why? Because it was the disease which perchance first roused the suspicions of the breeder as being hereditary in its character, and that to breed from blind animals was a mistake. I do not wish it to be understood that every animal affected with any one of these diseases is to be avoided as unfit to breed from. I am well aware that each and all of them may arise from accidental causes. A careless carter, by dropping the shaft upon his horse's coronet, may produce a sidebone; a blow at the back of the hock may create an enlargement resembling a curb; an injury to the eye may cause Cataract; and I believe that senility, or a very bad attack of Strangles, may occasion Roaring or Whistling. I would, nevertheless, recommend that care should be taken to determine whether such injuries had been inflicted, or whether the seeds of the disease had not previously existed, and only awaited the exciting cause to bring about its development. Some may be inclined to say, "If you object to breed from horses affected with Splints, you would have no horses to breed from." In reply to that, I would say that only in cases where Splints were both on the inner and outer surfaces of the legs, or on all four legs, conditions which fairly indicated that there existed a tendency in the animal's system to bony disposition, that I should consider them a decided objection. It is argued by some that it is a good plan to so mate animals as to counteract a defect. For example, to put a sound winded horse to a roarer, or a horse with Curb to one with very good hocks; but in my opinion, as a rule, this does not succeed, for it will be found that although the progeny may not in early life have the disease, there is a tendency to it—a weakness in the part which an exciting cause will sooner or later develop it.

Another matter I would allude to is that of in-and-in breeding. In the human being this is a fruitful cause of the production of disease, and, to an extent, I believe, in some of the lower animals; but with horses the results do not appear to be so disastrous—indeed, to secure some special qualities, the plan is very useful. In all cases crossing should be adopted with great care, and only with the object of introducing some valuable quality, such as strength, speed, or the like. It requires a very good horse-judge to cross horses well, and where one succeeds many fail.

As my remarks are intended to apply to horses generally, I shall say but little respecting points, because what may be a necessary good point in one class of animal may not be so requisite in another. There are, however, certain qualities which are desirable in all mares and stallions. In both, the chest should be capacious, formed by well-rounded, deep ribs; the loins should be short and wide. I like a wide forehead and bold-looking eye, a wide-developed nostril, and fairly arched neck. When approaching you, the

animal's chest should look wide, with the forelegs, as it were, standing outside it ; while, when you are behind the horse, it should show good first and second thighs. When standing still, as my friend, Mr. Reynolds, very tersely puts it, "with regard to position, the limbs should be so placed that each extremity, and each bone thereof, supports its due proportion of weight." Below the knees and hocks, the legs should be short, the pasterns moderately oblique, and the feet of medium size and obliquity, with a good amount of heel. Over the whole body there should be a good development of muscle, and this should be even in every respect—one limb should exactly correspond with the other, one side with the other.

With reference to the condition of stud animals, I think that our stallions are kept far too fat. Of course this is, to a great extent, owing to required appearances in the show-ring. I nevertheless think it is a mistake. Such a condition unquestionably enervates the animal, and has a baneful influence on the progeny in the way of action, vigour, and courage. I recommend, with regard to both sexes, that a fair amount of good provender be allowed, and that a moderate amount of work or strong exercise be given.

There are many other matters which might be dilated upon ; for example, the treatment of the mare in foal during the whole period, the general management of the horse, the rearing of the progeny, and numerous other circumstances connected with this, to my mind, interesting and important study, which I should have liked to have gone into in this paper; but I know that a short paper is a more acceptable one, and therefore I will now close. Nevertheless, I shall be pleased to endeavour to reply to any remarks which may be made in reference to the whole subject.

An animated discussion followed, opened by Mr. GREAVES, commencing with age. He said he was of opinion that much injury was done both to sire and dam by breeding too early, and asked the Professor to give his opinion as to age. In his replies he stated that three years was quite young enough. Mr. Greaves quite agreed with the essayist that as a rule the *mental faculties* are derived from the dam, and the *physical* from the sire, and gave an interesting case in point. A mare had a peculiar action in snatching away the off fore foot during shoeing. She bred six foals, all of which had the same action. Further, the sire of one of the foals had Navicular Disease, and out of the six, this was the only unsound one, and this had Navicular Disease. Referring to examinations, he considered we ought to take a wide view and be guided by circumstances. Horses, for instance, with Side-bones, if in strong good feet, will often do a great deal of work without going lame, and Spavin also, if not causing lameness, at six years old, may be considered practically sound.

Mr. MARTIN was of opinion that cart-horse breeding can be done remuneratively, if proper care be taken in selecting dams and sires; he considered it would not cost more than £35 to rear a colt to two-and-a-half years old, after which time the cost would be next to *nil*, the animal earning his keep on the farm until five years old, when if sound and well-made would be worth £80 in London. He was of opinion that none but sound horses ought to be allowed to travel, horses that had two veterinary certificates with them, and none but those registered in a stud book. He also believed that many sires were ruined when colts, through excessing using and bad feeding ; although a colt may be used at two years old without any injury, he considered that we get the best foal from a fully-matured dam and sire, say, five years old.

Mr. SANTY drew attention to the examination of horses at shows, describing it as a farce to examine the number in so short a time, and it is next to impossible to see the eyes out in the open. He further drew attention to a work on pathology, in which the author says that if Side-bones exist in

strong, sound feet they do not constitute unsoundness, and asked Professor Pritchard for his opinion, and also as to the best method of determining the existence of Spavin.

Mr. AUGER, referring to mating, asked whether it were best to use cart mare and blood sire or *vice versâ* in breeding of hunters.

C. WATERS, Esq., in speaking of shows, considers that some restrictions ought to be put on animals which are kept wholly and solely for show purposes, as the farmer and breeder had not a chance in competition with such animals. He considered three years old too young to breed mares, and was certain he had more than one animal spoilt by so doing. He drew attention to the fact that even good-bred animals were sometimes uncertain as to what progeny they threw; had seen a mare throw three good large foals and then two small ones, and afterwards again breed some good ones; considers we get the best animal by using a cart-horse and a blood mare.

Mr. BRAY thinks that quite as much inferior stock is produced from using old sires and dams as young ones, and asked whether Navicular was hereditary when arising from an accident.

Mr. BANHAM thinks that not only are many diseases are hereditary, but also scars and other lesions of tissues are reproduced in offspring. Does not consider that in-and-in breeding is injurious provided you have thoroughly sound animals to breed from, but if unsound you simply increase the severity of the weakness; thinks judicious crossing is beneficial, but prefers keeping to one strain if sound and answers purpose, as it is very difficult to mate; at its best is a lottery. Believes that progeny of an animal depends very largely on the produce of the soil and atmospheric influences, in proof of which he drew attention to the fact of breeders in Yorkshire being able to produce much larger animals than in most other counties in England, and still more marked are the changes in exported animals. In India even, if they breed from the best imported English blood in a few generations they have so deteriorated as to be simple weeds. Thinks we cannot be too particular in selecting parents; should always prefer an indifferently-shaped sound animal to a better-formed unsound one.

Mr. WRAGG thinks that not only in breeding do we require sound animals and judicious mating, but also a fair share of luck to do it profitably; is certain that horses have not the stamina they had a few years since. In examining horses at shows should have every prize animal examined by three veterinary surgeons before they receive it.

Mr. OVERED stated that not only were the diseases enumerated in his opinion hereditary, but also Hernia (Scrotal and Umbilical), Caries of molar teeth, Rheumatic Arthritis of stifle joint, Bog Spavin, and Thoroughpin. He quoted an interesting case in the human subject which came under his observation, in which a man suffering from Scrotal Hernia had six sons, all of whom were more or less the same. Also a stallion with Scrotal Hernia got most of his stock with either Scrotal or Umbilical Hernia.

Mr. HAMMOND believed that the soil, and consequently its products, had much more to do with the alterations of animals when moved from one county or country to another than had atmospheric influences, and drew attention to alterations which Lincolnshire horses underwent when simply removed to Norfolk, losing the characteristic rough hair off legs and having smaller feet, although bred from pure Lincoln parents.

In reply Professor PRITCHARD considered that you can satisfactorily use a sire from three years until twelve years old; did not think that scars were hereditary, at all events not in the lower animals if in man, and that the deterioration of exported horses was due more to atmospheric influences than to food or soil. Referring to Side-bones, although he was aware that animals with Side-bones and good strong feet could and often did a good deal of work, and

not go lame, he strongly advised that we should never breed from such animals, and under no circumstances pass one sound. As to profitable breeding of cart-horses, he drew attention to the fact that in the last twenty-five years prices had quite doubled. He fully agreed with Mr. Martin that Colic from weak digestion was hereditary, and with Mr. Wragg's suggestion that there ought to be three veterinary surgeons to examine at shows, because frequently in the excitement and flurry of a show-yard an unsoundness might escape the notice of one but not of three veterinary surgeons. In determining existence of Spavin, always compare one hock with the other, both with hand and eye, and if not alike consider them unsound. In breeding hunters, thinks the best cross is a light cart-mare with thoroughbred sire, but if we use this progeny with thoroughbred sire will do better, as we shall get more staying power. In conclusion, of all hereditary diseases he looks upon Navicular as the most so.

Mr. BANHAM proposed a vote of thanks to Professor Pritchard, for his kindness in giving such an admirable and practical paper.

Mr. GREAVES seconded, and asked Professor Pritchard to allow his essay to be published.

Professor PRITCHARD having responded and kindly consented to his paper being published, a most successful meeting was brought to a close with a vote of thanks to the President for so ably conducting.

Most of the members and guests afterwards partook of a most enjoyable dinner, where they were honoured with the presence of Professors Robertson and Brown.

After dinner the usual loyal and professional toasts were given and cordially responded to. R. S. BARCHAM, *Hon. Sec.*

YORKSHIRE VETERINARY MEDICAL SOCIETY.

THE summer quarterly meeting was held at the Queen's Hotel, Leeds, on the 29th July ; the President, Mr. Benjamin Smith, F.R.C.V.S., in the chair.

The following members were also present, viz., Messrs. T. Greaves, J. W. Anderton, J. E. Scriven, P. Walker, T. Fletcher, T. Pratt, J. Bale, A. W. Briggs, W. F. Greenhalgh, G. Whitehead, G. T. Pickering, A. W. Mason, H. Pollard, M. Robinson, S. Chambers, and the Hon. Sec.

Messrs. Exley and Anderton were present as visitors.

Apologies for non-attendance were received from Messrs. Dray, Danby, G. Carter, and Cooper.

The minutes of the previous meeting were read and confirmed.

Mr. Walker exhibited his new dental forceps, with which he had comparatively easily extracted the fifth molar from the sup. maxillary bone of a horse ; these forceps are extremely short in the jaws, the depth of the same being only 1¼in., thus giving them such great grasping power, that unless caution is exercised, the tooth might be broken. The length from the centre of fulcrum to centre of jaw is only one inch ; hence the nearer the fulcrum is to the jaw, the greater the leverage, and less liability to injure the tooth on which the fulcrum rests. The jaws of the forceps incline a little outwards, in order to allow the full leverage of the width of the mouth ; the forceps now in use being both clumsy and deep in the jaw, the operator found it difficult to use them between the superior and inferior posterior molars.

Mr. ANDERTON proposed, and Mr. GREENHALGH seconded, that a pair of Mr. Walker's dental forceps be purchased for the use of the members.—Carried.

Mr. Walker exhibited a remarkable specimen of Hypertrophy of the Stomach of a pig, the result, in his opinion, of chronic Swine Fever ; the

mucous membrane being terribly ulcerated, and presenting in a marked manner the ravages of this troublesome malady.

Mr. ANDERTON said that lately the discoloration of the skin in Swine Fever cases had not been so marked as formerly, but the diarrhœa had been very severe.

The PRESIDENT said that frequently in Swine Fever there is no ulceration of the mucous membrane of the stomach, or in the region of the ilio-cæcal valve, the fever carrying the animals off before ulceration has taken place.

Mr. FLETCHER asked the reason why pigs die so quickly from Swine Fever, the *post-mortem* appearances not being sufficiently indicative.

Mr. SCRIVEN thought the animals died from shock to the cerebro-spinal system.

Mr. BRIGGS was of opinion that pigs died from congestion of the blood corpuscles, causing failure of the heart's action. He thought the hypertrophied stomach upon the table had been diseased for a longer period than Mr. Walker was cognisant.

In reply to an inquiry from Mr. BRIGGS as to the action of the drug Physostigmia, Messrs. GREAVES and FLETCHER said their experiences of its action were not very favourable; Mr. Fletcher had given two or three drachms hypodermically, but he thought it acted more as a sedative than a purgative.

In answer to a question from Mr. FLETCHER as to the best local treatment in cases of open joint, Messrs. GREAVES, WALKER, POLLARD, PICKERING, MASON, and the SECRETARY explained their treatment of these troublesome cases.

Mr. GREAVES described a case of Luxated Patella in a draught-horse, in which the luxation remained after several attempts at reduction; after a month had expired, he administered chloroform, and pulled the limb forcibly backward, the patella was heard to slip into position, and there was no further trouble.

Mr. WHITEHEAD related a case of vomition in a mare, the cause of the attack not apparent. It passed off quickly, the mare resuming work next day.

Mr. FLETCHER described a case of choking arising from vomition in a pony; he was compelled to open the trachea in consequence of the nostrils being plugged with the expelled food, also washed out the air-passages with Read's syringe, and the case did well.

The concluding quarterly meeting will be held on the 27th October, when Mr. P. Walker will read a paper "On Ventilation and the Diffusion of Gases, with Practical Demonstrations."

W. BROUGHTON, *Hon. Sec.*

NORTH OF ENGLAND VETERINARY MEDICAL ASSOCIATION.

THE usual quarterly meeting of this Association was held at the County Hotel, Newcastle-on-Tyne, on August 27th, 1886, the President (J. B. Nesbit, Esq.) in the chair.

Present:—Messrs. Nesbit, Fence Houses; G. R. Dudgeon, Sunderland; Mulvey, Bishop Auckland; Gofton, North Shields; Chivas, Corbridge; Grieve, Blaydon; Stephenson, W. Hunter, A. Hunter, H. Hunter, Elphick, and the Secretary, Newcastle-on-Tyne.

The minutes of the previous meeting having been confirmed, Mr. F. Brown, Newcastle-on-Tyne, was unanimously elected a member of the Association. Mr. F. R. Stevens, Darlington, was also nominated for election at the next meeting.

It was proposed by Mr. Mulvey, seconded by Mr. A. Hunter, and carried unanimously, that a vote of condolence should be sent to the widow and

nephew of the late Mr. M. Hedley, of Darlington, who for so many years had been a member and supporter of the Association.

Mr. Chivas then read a most interesting and exhaustive paper on "Anthrax"; a long and animated discussion followed, in which all present took part.

Votes of thanks to Mr. Chivas for his paper, and to the Chairman for presiding, brought the meeting to a close. COLIN GRESTY, *Hon. Sec.*

CENTRAL VETERINARY MEDICAL SOCIETY.

THE final meeting of the session was held at the First Avenue Hotel on the 1st July. The President, Mr. F. W. Wragg, and ten Fellows attended.

Mr. RAYMOND asked permission to correct an error which, he said, appeared in the printed report of the meeting held on May 6th. His statement that the parasite had two flagellæ referred to the micro-organism of the rat; that found in the horse and mule he described as having only one.

Purpura Hæmorrhagica.

Mr. ROOTS said that the subject of Purpura Hæmorrhagica had been selected for discussion, and he would, in accordance with his promise, offer a few remarks as an introduction. He described it as a blood disease, either primary or a sequel of other complaints. Causes very obscure, the disease appearing under totally opposite conditions, in plethoric and debilitated states of system; in healthy, well-managed stables, and the reverse. The blood seemed to lose its normal density, and was extravasated through the capillary walls, which, in some fatal cases, became ruptured. Symptoms—petechiæ on the mucous membranes, occasionally hæmorrhage, large swellings with well-defined margins, particularly affecting the limbs, head, abdomen, and sheath; respiration was often impeded by the tumefaction; pulse weak, bowels constipated, but sometimes violent and fatal purgation followed intestinal extravasation; urine high coloured. Medicines—Chlorate of potass; first dose half an ounce, after which two drachms every six hours. In some cases and stages Liq. Ferri. Perchlor., half an ounce every six hours, with Spts. Ether Nit. Swellings to be sponged with acidulated cold water. He also described the *post-mortem* appearances, and read notes of interesting cases.

Mr. ROWE said that the last case of Purpura under his care was somewhat peculiar; it followed an illness of some weeks' duration. The skin puckered, and presented a shrivelled appearance in every part, several large swellings formed, and blood exuded in places. He gave nitrate and carbonate of potass. The symptoms disappeared in a few hours. He had known instances in which cutaneous hæmorrhage had occurred to a dangerous extent.

Mr. CATON was of opinion that the case described by Mr. Rowe was one of Urticaria Tuberosa. He had lately had many patients with Purpura. It had, indeed, appeared to him to be epidemic. One severe case terminated in a condition of things to him rather novel. Before death much effusion formed round the larynx, and greatly impeded respiration; then vomition occurred. Upon *post-mortem* examination, the walls of the stomach were found immensely gorged with serum, and were so thickened and puckered that the stomach was firmly closed.

Mr. GIBBINGS alluded to the statement that Purpura appeared in good and in unhealthy stables, indifferently, and affirmed that in nine cases out of ten it might be traced to infringement of hygienic or sanitary regulations. Much of his experience had been gained with firms which kept a large number of horses, in stables in which great care was taken to ensure perfect sanitary conditions, and among these horses he could not remember meeting with a single case of Purpura Hæmorrhagica for six or seven years or more.

Mr. RAYMOND considered, from the description of Purpura, that it bore a great resemblance to Anthrax, a disease with which he had had much acquaintance in India. He had not observed in the latter malady the presence of petechiæ, but the whole visible extent of the Schneiderian membrane was often of a dark purple colour. The disease came on suddenly, swellings appeared, and there was effusion into the trachea, frequently, also, sloughing of the facial muscles. A diagnostic symptom of Anthrax was the effusion of serum into the intestinal coats, as described by Mr. Caton and other speakers. He had seen horses die in extreme agony, apparently suffering from Colic, and had found that serous effusion had occurred in the mesentery, particularly in the region of the double colon. In this fluid he had found Anthrax bacilli, and no other appearance of disease had been discoverable beyond effusion into the trachea, and slight pulmonary congestion.

Mr. BROAD admitted that there was a certain similarity between Anthrax and Purpura ; in both the blood was the seat of morbid change, yet the tendency of Purpura was to terminate favourably, while Anthrax was generally fatal. One case of the former disease, which came under his notice a few months ago, certainly did suggest Anthrax to his mind. The horse was taken ill in the morning, the head and limbs rapidly swelled, the Schneiderian membrane became purple over all its surface, and death occurred before night. The blood was found very dark, and the muscles and under-surface of the skin were deeply stained. The remedies said to be serviceable in Purpura appeared most diverse—chlorate of potass, turpentine, perchloride of iron, or acids, and even ergot of rye. Could the mode of action of each be accurately known, a valuable insight would be obtained as to the cause of the disease. He placed most reliance on the mineral acids, though for cases associated with catarrhal and febrile symptoms, chlorate and nitrate of potass would first be needed.

Mr. HARRISON had recently had some trouble with a patient which suffered from the malady while out at grass. Wherever the engorgement appeared beneath thin parts of the skin, extensive sloughing took place after four or five days, and healing was very slow in progress. On the inside of the thighs, on the abdomen and face the sloughs were most prevalent.

Mr. VILLAR thought it would be remembered that Purpura was described by the best authorities as of two kinds—sthenic and asthenic. Probably the cases of the first type were anthracoid in character. Some forms had, he considered, rather the characteristics of Scarlatina, light-red spots appearing on the Schneiderian membrane, more on one day than on another. There was also sore throat—a marked feature of this complaint in the human subject. He thought tracheotomy was a dangerous and useless operation in Purpura.

Mr. WRAGG regretted that one important point, the pathology of the disease, had not been more fully considered. It had been, he said, a disputed matter whether Purpura was to be regarded as mainly a diseased condition of the blood-vessels, or of the blood itself. His own view was that it was due to a relaxed, toneless condition of the vessels, which allowed the blood to transude into the surrounding tissues, this naturally occurring principally in the dependent, or lower parts of the body, where the force of gravitation came into play. He could not agree with the statement that the disease was traceable to bad conditions of stabling ; it appeared under all kinds of surroundings, whether the stable was healthy or not. Sloughing was not, he said, infrequent, and to be accounted for by the imperfectly nourished state of the system generally, and the disordered condition of the capillary vessels. Healing, too, under these circumstances was, of necessity, a slow process, especially where such large portions of skin had been destroyed, a deficiency which was but tardily supplied at any time. Lancing the swellings was, he considered, a measure to be avoided ; it was far from desirable to make any

wounds in such a state of the system. He had performed tracheotomy in Purpura, but had never known it avert a fatal ending of the case.

Mr. CATON said he had, in certain instances, used the lance with advantage. On one occasion the patient's penis was protruded and enormously swollen. After a dozen incisions the organ was reduced, and retracted.

Mr. HARRISON had incised when he considered it imperative, and found the wounds healed favourably.

Mr. MOLE referred to the suggestion of Mr. Raymond, and said he had examined the blood from purpuric patients, but had not found any bacilli. The blood corpuscles appeared disintegrated and shrivelled, and the colouring matter exuded into the surrounding serum. He had successfully treated many cases with turpentine in large doses, giving two ounces at a time, mixed with linseed oil.

Professor PRITCHARD gave it, as his opinion, that not the faintest relationship existed been Anthrax and Hæmorrhagic Purpura. Purpura attacked horses under all conditions. The animal may have been suffering from illness, or may have appeared in perfect health previous to the attack. Again, the horse standing nearest—in fact, all in the stable—will remain unharmed by the disease ; this is not the case with Anthrax, which can generally be traced from one animal, or stable, to another. He had microscopically examined the blood, and found no bacilli in Purpura, merely shrunken corpuscles and coloured serum. As to the cause of the disease, we were, he said, in the dark ; whether the morbid state of the blood affected the nerves, or whether the nervous system was primarily deranged was undecided. Still, however produced, there was a loss of tone in the blood-vessels, and the blood in its depraved condition escaped by extravasation, no rupture of vessels taking place, as had been suggested by some speakers. If there were a specific for the complaint it was turpentine. It should be applied externally, as well as given in large doses internally. Its best vehicle was linseed tea. He had known it to be applied externally, without internal administration. In such cases the swellings disappear and the animal appears to do well, but serious symptoms soon follow, even death, and extensive gelatinous effusion will be found in the walls of the intestines and stomach.

Mr. ROOTS said he could not endorse the opinion of Mr. Caton that Purpura ever appeared as an epidemic, nor did he think that unhealthy conditions of stabling and management were responsible for its appearance. He had tried turpentine as a remedy in several cases, but found the unpleasant results spoken of by Mr. Gibbings, congestion of the lungs among others. The medicines he preferred to use were chlorate of potass, and hyposulphite of soda.

ALFRED BROAD, *Hon. Sec.*

ROYAL COUNTIES VETERINARY MEDICAL ASSOCIATION.

(*Continued from page* 210.)

The *bacillus of Symptomatic Anthrax*, Blackleg, Quarter Evil. These bacilli are found in the subcutaneous tumours which occur in the disease. They are about the size of those found in Malignant Anthrax, but are rounded at the ends, and often include a bright spore at one end, which never occurs in the bacillus of Malignant Anthrax. Some of the bacilli are motile (Klein). Inoculat ios always prove fatal to guinea-pigs, rabbits, sheep, and calves. Injections into the veins of larger animals in small quantities only produce febrile disturbances ; large doses produce death. Small doses protect the animal against the effect of what otherwise would be fatal doses, according to Arloing, Cornevin, and Thomas.

Bacillus Anthracis —As long ago as 1855 Pallender recognised bacteria in the blood of animals which had died of Anthrax. The labours of Koch and

Pasteur have taught us more about this bacillus than we know of any other fungus we are now dealing with.

As I am able to show you some preparations of this bacillus, I need not give a long description of it. The bacilli occur in large numbers in the blood and excreta of dying animals, and can live on decaying matter found in the fields. They also develop spores when there. These spores may be washed into other places by rain, or may be carried off by the wind.

Animals may become inoculate in a variety of ways ; such as through wounds in the mouth, by the stings of insects, through the respiratory and intestinal tracks.

In man the disease in called Malignant Pustule, or Wool Sorters' Disease.

Everybody knows that animals inoculated with attenuated cultures are rendered immune against the virus ; but only for a time.

I mentioned above that bacilli can only form spores in the presence of air. This is a matter of considerable importance ; for it results from this discovery that there is far less danger of infection from a carcase which has not been opened than from one upon which a *post-mortem* has been held. Observations on the smaller animals have shown that Anthrax bacilli degenerate in five to eight days after the death of the host, and disappear from the blood, spleen, and other organs. If therefore the bacilli, by being kept from the air, have been prevented from forming spores, the danger of contamination is much reduced, but not destroyed ; for before it dies the patient evacuates thousands of bacilli, which, once in the air, are liable to grow spores.

The Tubercle Bacillus.—The importance of this bacillus has been so thoroughly recognised by the sister profession, that its presence in the sputum of suspected persons is diagnostic. I am able to show you some specimens from bovines under the microscope.

It is not improbable that before many years have passed this means of diagnosis will be introduced into our practice. It is an interesting question whether human Tuberculosis and bovine Tuberculosis are identical. Authorities vary in their opinion. Klein denies their identity.

It appears to me that the weight of evidence shows that bovine Tuberculosis is communicable to man and from man to bovines. (*Vide* the experiments of Villemin, Chauveau, Gerlach, and Colin.) Dr. Acland, in a recent work, has published a number of cases in which mankind has died of bovine Tuberculosis. Dr. Fleming has also noted cases. It is also supposed that Scrofula and infantile Diarrhœa are often caused by consuming the milk of Tuberculous cows.*

Spirilla or Spiro-bacteria.—Spirilla are filaments of a spiral shape and motile. They are capable of forming spores, and generally have one or more flagella.

The most interesting for us is the spirillum of Surra, discovered by Dr. Evans, though he does not agree with Steel that it is a spirillum. The history of this parasite has so recently appeared in the VETERINARY JOURNAL as to render it unnecessary for me to go into details. Through the kindness of Dr. Evans I am able to show you a dried specimen under the microscope. It is to be regretted that this specimen has not been well mounted. In India, where Mr. Steel prepared it for Dr. Evans, there is rather a dearth of microscopical apparatus.

Dr. Evans informs me that the specimen is considerably shrunken.

Actinomyces.—This radiating fungus is now classed amongst the bacteria. It finds its way into the organism by the natural openings and through wounds.

* The sanitary authorities of Paris have recently ordered the removal outside the fortifications of nearly all the cows in Paris.

Hitherto it has been supposed to inhabit man, bovines, and swine, but lately Johne has published some cases, which I translated for the VETERINARY JOURNAL, in which he states he discovered the organism in several cases of Schirrous Cord following upon castration of horses.

I have brought for your examination some drawings of the parasite.

There are a few questions so closely connected with bacteriology, that it may not be out of place to say a few words about them.

Spontaneous Generation.—Among the advocates of spontaneous generation, Pouchet ranks first. (*Traité de la Génération Spontanée; basé sur des nouvelles expériences*, 1859.) According to this savant, the essentials for the production of new forms are a putrescible body—water and air; while heat, light, and electricity considerably favour the process. He examined air dust, and though he admits having found spores of fungi, and other microscopic organisms, he does not consider they were in sufficient quantity to explain the number he found in infusions, for he asserts that the bacteria themselves do not increase in number by fission (or but very slowly), but that on the contrary each is spontaneously generated. Unfortunately for Pouchet's theory, Pasteur and Cohn have proved that bacteria can be caused to grow in inorganic mixtures, which are therefore not subject to putrefaction. It is also well known now that bacteria do multiply by fission. Pouchet's theories are therefore exploded.

Dr. Bastian, in "Beginnings of Life" (1872), took up another standpoint, and attempted to demonstrate that vital force and living matter may arise *de novo* under the action of the ordinary physical forces—heat, light, and electricity.

He took an immense amount of trouble to experimentalise in support of his views. But Professors Huxley, Tyndall, and Ray Lancaster have demonstrated that Bastian's experiments were not conducted with sufficient accuracy of method. The *de novo* school has very few followers now.

In former days, it was believed that frogs were generated by solar rays from mud; that intestinal worms were created spontaneously; that swallows hibernated under water in marshes, and so on. Just as these views have lost their hold on men of the present day, so a few years hence Dr. Bastian's opinions will cease to be entertained by scientists.

It is true, however, that there are veterinary practitioners who quote instances of spontaneous outbreaks of contagious disease. I have more than once been assured that Glanders is caused by dirt and bad ventilation, and instances have been quoted. Unfortunately, these examples were never extant at the time, so it has never been possible for me to investigate the matter; however, I can tell you of some cases where disease has occurred apparently spontaneously—viz., Pasteur's Anthrax experiments, where animals were buried in a field and contaminated others which were allowed to graze some time afterwards. Professor Axe's investigations in a recent outbreak of Anthrax. A horse was placed in a box which had contained an animal which had suffered from Erysipelas, and contracted the complaint. Formerly, such a thing would have been looked upon as a singular coincidence. The occurrence is easily explained now.

Darwin, in his book upon "The Effects of Cross and Self Fertilisation in the Vegetable Kingdom" (London, 1876), p. 405, mentions that a thick layer of coniferous pollen suddenly covered the fields in the neighbourhood of St. Louis, in Missouri, and he has good reason to state that it came from forests at least 400 miles off. Substitute Anthrax germs for pollen, and you would probably have a mysterious outbreak of disease, which would be looked upon as of spontaneous origin.

If time allowed, many other instances might be enumerated.

Another interesting question is, Is it possible that non-pathogenic microbes may, in the course of time, become pathogenic?

It is known that some microbes are materially affected by temperature and pabulum offered them. (*Vide* the works of Pasteur, Koch, and of Veterinary Surgeons Chauveau, Toussaint, and Arloing.)

Some scientists assert that they have been able in certain cases to convert non-pathogenic into pathogenic fungi. Among these rank V. Nägeli, Buchner, Sattler, and Grawitz.

Buchner states that by constantly varying the cultivation media he saw the Anthrax Bacillus gradually become converted into the Hay Bacillus.

Klein and Koch and many others put these observations down to imperfect methods.

Personally, I am inclined to think that a non-pathogenic may become pathogenic, not as rapidly as V. Nägeli and his school think, but in the course of many thousands of cultivations. I believe that an alteration may be made in the breed of a bacillus, just as it is possible to change the appearance and properties of sheep, dogs, horses, roses, etc.

The readers of Owen, Darwin, and Huxley will easily call to mind instances of changes in species, but only after thousands of years.

Besides the grounds mentioned, I would point out that a new and powerful school is growing up in France, headed by Gautier and others, which asserts that it is not the micro-organisms which cause disease, but the excretions of the microbes.

These excretions are alkaloids, and go by the name of Ptomaines, Leucomaines, Sepcine, etc.

Many who deny that a non-pathogenic microbe can become pathogenic may not be prepared to assert that, under certain conditions of feeding the excretions may not become altered, even to the extent of becoming poisonous to animals.

Indian travellers can tell you of the poisonous effects which sometimes occur from eating Bombay oysters. It is supposed that this is brought about by the peculiar pabulum they are accidentally fed on sometimes.

The matter is *sub-judice;* the mutability theory is supported by many botanists and a few pathologists; but I confess that at present the weight of evidence is not in its favour.

The question may be asked, How is it when pathogenic germs appear to swarm in the air that men and animals still contrive to live?

In answer to such a query, I would point out that pathogenic germs are not always present; they travel in clouds (Pasteur), and just as the sky is free from clouds at times, so is the atmosphere from germs. Again, it has been demonstrated by Professor Ray Lankaster, Mr. Bland Sutton, and Metschinkoff that both vertebrates and invertebrates possess amœboid cells which have the power of digesting (intracellular digestion) organic substances. Human blood-corpuscles taken up by the mesoderm cells of bipinnaria become completely absorbed. Metschinkoff has demonstrated that when the spermatozoa of the sea urchin were introduced into phyllirhoë they were quickly surrounded and eaten up by the mesoderm cells.

Observations on the necrotic organs of invertebrates (tadpoles) have shown that it is the function of mesoderm cells to devour the dying elements of such organs.

If fluids containing bacteria be injected beneath the skin of bipinnaria and others, they will soon be found within the substance of many amœboid cells.

In many cases the bacteria lose their mobility, and become so delicate as scarcely to be visible. In Botryllus, Metschinkoff found a spirochœte closely resembling the *Spirillum Obermeyerii* of Relapsing Fever, and a small bacillus like the Lepra bacillus. In both cases they were pursued, digested and absorbed by the mesoderm cells, some of which perished in the

attempt, and could be seen with long bacterial filaments projecting from them. The same process may be seen in the blood of vertebrates, where in bacterial affections, such as Anthrax, the bacilli are taken up by the leucocytes.

Bland Sutton, quoting Metschinkoff, tells us of combats witnessed by the latter in the daphnia, between the white cells of the blood and bacteria, and how, when one cell was not sufficient to attack the invading bacterium, two or more would fuse together, surround, digest the intruder, and rid the daphnia of it. "Can these facts be applied to mammals?" If the cornea of a rabbit be irritated with nitrate of silver, leucocytes are poured out from the vessels with a view to repel, and, if possible, to destroy the offending material.

But the blood-cells do not always get the best of these bacterial combats. For Dr. Evans, in his investigations on Surra, has demonstrated that the parasite in this case attacks the blood-cells, and has observed them demolishing the blood-cells.

I may add that Surra is invariably fatal.

Cheyne has also demonstrated that if a small quantity of ordinary bacterial fluid be injected into a healthy animal, the bacteria lose their vitality and disappear. On the other hand, he has also proved that if the animal is out of health, organisms can live much more easily in their blood and tissues.

These investigations show how it is that some animals are able to escape infection, and others contract a disease in a mild form. They will also account for Glanders following upon debilitating diseases.

In conclusion, gentlemen, I beg to call your attention to the points raised in the latter part of this paper; I believe almost every practitioner has an opinion upon them.

The questions I submit particularly for your opinion are:—

1st. What is your opinion upon the subject of spontaneous generation? Give the results of your experience.

2nd. Do you consider a micro-organism can become pathogenic?

3rd. Do you consider a pathogenic microbe can become non-pathogenic?

I do not wish to limit the discussion to these points, but merely to select a goal towards which we can travel during the meeting.

(*To be continued.*)

SOUTHERN COUNTIES VETERINARY MEDICAL ASSOCIATION.

(*Continued from page* 197.)

Mr. GREAVES said he had travelled many miles from one part of England to hear Dr. Fleming, and he was highly gratified at the observations made. It had been his practice to listen to papers read before veterinary associations for the last twenty or thirty years, but he had not heard one of more importance. He had been in practice for fifty-three years, and had seen only a few cases of Hydrophobia or Rabies; he had seen one or two in dogs and one or two in human beings, and a more horrible death no man could possibly die. If there was only one in a century it was quite sufficient for man to do all that possibly could be done. (Hear, hear.) Here was a case:—A friend of his had a dog, and took it with him once to spend the evening with a Dr. Taylor, who was an extraordinary man, but not a surgeon. While there Dr. Taylor eyed the dog carefully, and said, "That dog is mad." His friend replied, "Impossible;" but the doctor said, "I tell you it is so, by the expression in his face." His friend retorted, "Nothing of the kind; I ought to know better than you; I have had it several years." It was a spaniel dog, and the doctor added, "If you don't believe me, take my advice and poison it; depend upon it there will be mischief if you do not." The friend did not believe it, but still in less than a week the dog was

rabid mad. That Dr. Taylor had a sort of intuitive knowledge that the man did not possess, and very likely if the dog had been taken to a veterinary surgeon he would not have seen that peculiarity of expression which an experienced man would detect. Another friend of his was bitten, and died of Hydrophobia, raging. This was a case which might happen to any one of them as veterinary surgeons who treated dogs. A strange dog came in with a broken leg. He wished to impress this upon them, that the man was the very last they would think likely to become affected with Hydrophobia—non-nervous, non-excitable, quiet, calm, and very temperate. He bound the dog's leg up, but while tying its mouth the dog snapped at his finger. He went immediately to the water, washed the wound with nitrate of silver, and cauterised it thoroughly. Three weeks afterwards he felt a little pain up his arm. It was summer-time, and he went to the tap to get some water. Before reaching his mouth, however, down the glass fell. It was impossible for him to retain his hold of the glass. He thought, "What is this?" It was something strange, but he did not feel ill. He took another glass, but just as he was raising it to his mouth it again fell. He went to his master, who was a veterinary, and also a human, surgeon, and took him to the tap, when the same form was repeated. The doctor sent him to bed, and called in two other doctors, and in two days, frothing like a dog, barking like a dog, tearing the sheets, he died raging mad. It was a dangerous thing, and a serious matter, and he bore Dr. Fleming out in all he said about putting a stop to it. If Legislation for one year would make a determined effort to put it down, many lives might be saved and also many horrible deaths prevented (Applause.) He might add, in explanation of the case he had cited, where his friend said his dog could not be mad, it was found afterwards that in Carlisle, ten months before, the dog had been drawn under a butcher's cart and bitten by a dog which afterwards proved to be mad.

Mr. MARTIN remarked that their meeting was an important one, and it was gratifying to see some medical friends with them. They would have the result of their experience, and no doubt this would be reciprocal. He had happened in his lifetime to have several cases of Hydrophobia or Rabies. With regard to M. Pasteur, he should like Dr. Fleming to give them a description of his mode of treatment, and then they could give their opinion upon it. No doubt many of the cases were taken over to him in a fright, were treated by him, and though not perhaps really Hydrophobic, he got the credit of curing them. Whether this was so or not he could not say, but in all probability he should think it was. It was necessary that members of their profession should make themselves useful to the public, and he did not think Hydrophobia was so prevalent as some thought it to be, simply because many veterinary surgeons had never seen a case at all. He had seen horses, after being bitten by a dog, go mad and break up the stables. He should like to know about the disease being spontaneous; he knew Dr. Fleming's view on this point, and also in relation to Glanders, but believed that cases could be produced spontaneously. If they carried out his ideas properly and strictly, no doubt the disease would become extinct; but in order to do this he thought it should be placed under the Contagious Diseases (Animals) Act, so that the police and veterinary surgeons could take cognizance of and really stamp out the disease. That was the best plan, and he was equally certain that he had proved that a case of Influenza had degenerated into Glanders. Supposing 500 dogs had been killed, so much the better, and 500 more, if suspicious. A poor man might have a dog, but if there was any chance of its attacking the human subject, they had better kill 500 than have one death from Hydrophobia. He should like to know if contagion could be effected in any other way—by saliva, breath, blood, etc. Then, as to incubation, if the virus taken into the system passed through

the circulation once, twice, twenty times, or five hundred times. They knew as a fact that perhaps it would develop itself in a fortnight, or in other cases lie in a latent state for a year, or two years. He thought this might be shown by the statistics of some medical friends to-day. Very often people put themselves into such a state that they thought it was Rabies directly. What they wanted was to make themselves thoroughly acquainted with the diagnostic systems, so that they could speak to the public confidently and tell them whether a case was Rabies or not.

Sir FREDERICK FITZWYGRAM said they had heard a good many statistics, both as to the number of mad dogs probably in the country and the number of people bitten and affected by Rabies. He did not think these statistics were of much interest, because they were very uncertain and unreliable. The great question in which all were interested was, he thought, how far M. Pasteur, by passing the terrible disease known as Rabies through animals, such as rabbits, had succeeded in producing a modified disease that could be transmitted to prevent Rabies, as the human system was armed against Small-pox. If Dr. Fleming would tell them what was the result of M. Pasteur's operations, and the means taken by him, they would be grateful to him. He thought they would never be able to get all the statistics with regard to this disease, because it was so difficult to know whether a dog was really mad or not. He ventured to say that if M. Pasteur had not had a fatal case, he was a person to whom human society owed a debt of gratitude. (Applause.)

Mr. REDFORD said that, with regard to the frequency of cases of Rabies, he had had a good deal of practice, and in twenty or thirty years' experience only met with three cases. He had been frequently sent for to see cases of Rabies, receiving excited messages to see a mad dog, but on arrival found it was a trifling case of indigestion, etc. He believed that the numbers of cases represented to be Rabies were much exaggerated.

Mr. WRAGG said his dog practice was very limited indeed, and he had not seen many cases. He should like, however, to make a remark about the prevention of Rabies. He could not help endorsing what Dr. Fleming said about Rabies, and also Glanders. He thought it was a great disgrace to their Legislature that this disease still existed in the country. The disease was communicable to the human subject, and in each case where so communicated it proved fatal. There had been a regulation in the metropolitan district lately for dogs to be muzzled ; but how in the name of fortune that was to prevent Rabies while dogs in the provinces were allowed to run about without muzzles he did not know. Dr. Fleming had spoken about M. Pasteur, and he felt rather surprised at what he said at first about him, because Pasteur (as he said) would not put his name to anything unless he felt he was on the right track. But Dr. Fleming added that he would sooner suppress the disease, and that implied, to him (he may have been mistaken), that he had not perfect faith in M. Pasteur's treatment. He (Mr. Wragg) knew very little about Rabies, but if he had read correctly he should like to wait some time longer to hear how these 1,400 cases got on. So far as he was concerned, if he were bitten by a rabid dog he did not think he should go to Dr. Pasteur.

The CHAIRMAN said he wanted emphatically to thank Dr. Fleming for coming there that day, for they were all most gratified with his valuable address. In one statement he (Mr. Barford) agreed with many others who had spoken, and that was as to the numbers of dogs in London which were said to be rabid. He thought it was utterly absurd to say that 500 dogs in London were mad, either in six or eighteen months. He would rather take off the last figure, but could not help thinking it behoved them to be very careful indeed, and very slow, in coming to a decision as to Hydrophobia. He did not

think any cure required a longer investigation. Dr. Fleming had been asked as to M. Pasteur's treatment. They were all aware that Dr. Fleming had been appointed on the Commission now investigating the practice, and the probability was that, until their report was complete, he would not be able to give them a very straightforward account of what they were doing. But he thought with Mr. Wragg that it was very uncertain indeed, and that not more than one in ten of those who rushed from this country to M. Pasteur had ever been bitten by rabid dogs at all. They ought, however, to support and uphold in every possible way any scientific investigation such as M. Pasteur had undoubtedly given to the nation at large, and every person should give all the encouragement they could. At the same time they could not be too cautious in coming to conclusions so vital to humanity.

Dr. FLEMING then rose to address the meeting in reply to questions and interrogations, and was very cordially received. With regard to the report of the Chief Constable of London (Sir Charles Warren), from the 1st January, 1885, to May, 1886, this gave the total number of mad dogs during that period as 495. He had already expressed his disbelief in the correctness of that report, and until he knew the sources from which the information was derived he could not believe it—the number was far too great. But no doubt there were a great many cases of Rabies in London, and he would tell them why. The Home for Lost and Stray Dogs in London was admirably conducted, and dogs were received there from a radius of twelve miles—pretty well all the stray dogs of London. During 1885 no less than 25,578 were admitted—a very large proportion—and where they all came from he did not know. It showed the necessity of diminishing the number by fiscal measures. Of this number 4,615 found homes ; but more than 20,000 were destroyed as ownerless dogs—10,000 more than in 1884. This was an immense number, but showed exactly that as ownerless and wandering dogs increased, so did the likelihood of an outbreak of Rabies. Sixty dogs were infected with Rabies ; that was undoubtedly the case, and he would tell them why. Mr. Sewell, a member of their profession, was veterinary surgeon to that Home, and saw the cases every day while alive and after death, and he said that sixty were undoubtedly affected. There was not the faintest doubt that a good number of dogs were mad in London and the suburbs. His own experience would at least show it. The 1st Life Guards were one day in Wormwood Scrubs ; one of the horses was bitten severely by a dog, which was pursued immediately, but could not be killed. The commanding officer sent the horse home, and it was seen by the veterinary surgeon within half an hour. The wound was thoroughly cauterised. One morning, about four months afterwards, the horse was nervous and irritable, and the veterinary surgeon, immediately suspecting what was the matter, put it in a loose-box. The horse died within three days with symptoms of Rabies, which, once seen in the horse, could never be forgotten. There was no doubt about the outbreak in London, but from what had been said there by some as to their only having seen very few cases, their experience quite bore out what he had remarked as to the likelihood of successful preventive measures being introduced. If the disease was so rare as to exist in only a few centres, surely they might stamp it out. As to the disease being spontaneous in its origin, he was now perfectly satisfied it was not so. If it were, the result of all repressive measures would be null. In Australia there were great facilities for its development if the usual causes given could produce it. Bull-dogs were professional fighters, but they were less affected by Rabies, perhaps, than other dogs, so it could not be attributed to bites from enraged dogs. He was quite convinced that the virus could only be transmitted by inoculation. Therefore the disease could be as readily prevented as was Syphilis in man. With regard to symptoms, it had been mentioned that the presence of foreign

matters in the stomach was noticed in other than cases of Rabies. Quite true; they must put all the classical or characteristic symptoms together in order to come to a conclusion. In Glanders they might have only one or two symptoms present, but they must have all to be thoroughly satisfied. With regard to the legality of experiments, he did not know whether he was acting illegally, but he had often, when in doubt about Glanders, advised the purchase of a worn-out donkey for a few shillings, in order to submit it to test-inoculation. He thought this was perfectly justifiable, and, if he were summoned for giving such counsel, he submitted he should have a very good defence. He looked at the necessity of a licence only in those cases in which they were experimenting for research; but, in trying to diagnose a disease, they were not pursuing original investigation, but were simply trying to ascertain whether a suspicious case was really dangerous. He thought he would undertake this intra-cranial inoculation in Rabies if there was a necessity, in order to obtain decisive proof. With regard to M. Pasteur's protective system of treatment, M. Pasteur's work in other directions had developed and extended over so large a number of years, and had proved so thoroughly reliable, that he (Dr. Fleming), though at first in doubt about his protective treatment in Hydrophobia, must confess that his doubts were very much dispelled. M. Pasteur never published or submitted anything to the scientific world without thorough proof, and this proof he had furnished in Hydrophobia. No one had been more bitterly opposed than Pasteur, but he had conquered all the opposition encountered in his former discoveries, and there was not the faintest doubt indeed—speaking unofficially, but not recklessly—that he was now on the right track. He commenced about four years ago, when, having seen a child die of Hydrophobia, he got some saliva, and set to work with that intense devotion which he always showed when once he took up any subject. He demonstrated to a Commission in Paris that his preventive method in dogs was really so. He inoculated a number of dogs protectively, and then, after a certain time, he inoculated them and others with rabific matter, and it was found that nearly all, if not all, dogs which were not protected had died; and that of those which were protected not one died. He demonstrated this several times, and did everything he could in this direction except resorting to man for experiments—of course that could not be done. He tried the monkey, but found, when the virus was passed through the animal, that it became very much attenuated, so that this creature did not suit. He wanted to produce the disease in a brief space, and to be certain of producing the malady itself. Then he tried the rabbit, and, instead of being weakened through successive generations, the virus became intensely exaggerated, so that instead of three or four months, he could reduce the latent period to within seven or eight days in rabbit or dog by intra-cranial inoculation. Then the Hydrophobia sub-Committee went to Paris to investigate—not so much to see the process of inoculation as to ascertain the validity of the cases of people who had been inoculated protectively. Pasteur's books were thrown open to them, with the history of every case inoculated, description of the person when bitten, the symptoms presented, and, if possible, the certificate of the veterinary surgeon as to the dog's condition. Then they went to the people, and ascertained for themselves the whole history of the cases. They came back to London with twenty-six authentic cases of people bitten by mad dogs. Some were not cauterised, and some had been. So here were twenty-six cases of people to reply upon, and, in addition to that, fifty cases of dogs certified to be rabid. Here was a pretty good foundation of facts to work upon. With regard to the number of people who succumbed to Hydrophobia from dog-bites, this was one of the most difficult points to deal with. In 1872, when writing on the malady, he went over the sources of information, but there was nothing more difficult than to discover the average. Up to the present time

60 per cent. of the people bitten in hands and face—really uncovered parts—by really rabid dogs, and in which the wounds were not attended to, or only a long time afterwards, died of Hydrophobia. Of people bitten through clothes, and attended to, the proportion was about 15 per cent. In London six boys died from the bite of one dog, and he did not know how many others might have been bitten. The number of people who perished from dog-bite could not be fairly estimated, but there was not the faintest doubt that the saliva was the inoculating medium. At one time it would be profusely secreted, but at another time it would not be. But, nevertheless, they could not deny the fact of the existence of the malady termed Rabies, and that people did die from bites of rabid dogs, and that was quite sufficient ground to go upon to try surgical treatment, or suppress the disease. Another question was what proportion of cases would have died if not protected? Since that time there had been a large number of inoculations by M. Pasteur. Several of the people were bitten by wolves. These animals, when rabid, do not fly at the body, legs, or arms, but with terrible ferocity attack the face, and mangle it. Of the people who are bitten by wolves many die, the percentage being large indeed—80 or 90 per cent. In fact, the Russian peasant had nothing he was more afraid of in the wolf-haunted districts than bites by rabid wolves. One patient had been inoculated after forty days. The mode of procedure was very simple: after reducing the incubatory stage of the disease by transmission of the virus through rabbits—and they were dying every day in M. Pasteur's laboratory—he found the spinal cord and brain was the seat of the virus in its most concentrated form. The disease was produced by introducing the virus into the sub-arachnoid space in trephining the cranium. The animals became rabid in the course of eight or ten days, and died in the course of two or three days after. Immediately they were dead the spinal cord was taken out, cut into segments, and kept in the dry air of bottles. Every day these portions became less virulent, and in twelve or fourteen days they were nearly inert. When used for protection they were prepared in sterilised broth, and the patient inoculated every day for ten days. But each succeeding day it was a stronger inoculation than the last, until he really gave the virus at a very virulent stage; but no case of Hydrophobia had ever resulted from the operations. That was proved incontestably, although he (Dr. Fleming) was himself in doubt at first. Some rabbits had been brought over to the Brown Institution, and from them they inoculated two dogs and four more rabbits. One dog died in two days, after eight days' latency, which was a very brief period indeed for Rabies, so that there was no doubt whatever of the nature of the malady that M. Pasteur dealt with. The question arose whether, having the disease in so few centres in this country, it would not be the right course, instead of founding an institution here for the protection of people injured, and incurring the trouble and risk, by simple measures to get rid of the malady altogether? (Hear, hear.) He should never subscribe to the establishment of an institution in this country for the protection of people from a disease which he thought could be easily stamped out. The diagnosis was an important point, but was often lost sight of. A dog suspected of Rabies should never be destroyed. Generally, the first impulse was to kill it, but that was most senseless, as the symptoms could not be observed. Therefore, he would insist on suspected dogs being kept where they could do no damage, until the disease was fully developed. A dog so kept might not be rabid, and then they would have the satisfaction of saving its life; while, if it were so, and died, they could recommend measures to the police, and advise people in the district to take precautions. With regard to legislative action, he had for a number of years, in the Press and otherwise, insisted on including Rabies under the Contagious Diseases Act; and a Government Bill had just received the consent of Her Majesty which would

allow this to be done, as it ordained that it should cover all the contagious diseases of four-footed animals. So that now they could take measures under the Act to deal with Rabies. He thought at last, therefore, they had obtained what he had insisted upon. (Applause.) Returning to the point as to incubation, Dr. Fleming went on to say that by the intra-cranial inoculation they had limited the period of latency to between sixteen and eight days. Inoculation took certain effect in from eight to sixteen days; whereas with regard to the bite of a dog, it was well known that it was very uncertain. He did not know any disease except Glanders that was so uncertain. It extended over various periods, and was reported to be five or even six years in the case of man. But he thought if they allowed two years at least for the suppression of the malady they would be right. In one case, where two hounds were sent to a veterinary college, one died in three months, but the other was under close observation in a cage for twelve or thirteen months before developing symptoms. There was no doubt as to the case in the cage, but it showed they must allow a good time for the period over which suppressive measures must be extended. Nothing more nonsensical than the measures taken in London could be conceived. They applied to the whole Metropolitan district, but not to the City, so that if a mad dog ran through Temple Bar—or past the boundary which used to be marked by the Bar—it was perfectly safe! mad dogs might, therefore, swarm in the City, but not outside Temple Bar! So it was in other respects. In one county the Contagious Diseases Act was rigidly carried out, and not in another; the fact being that in these cases they were too much decentralised, and it required one central authority to do any good. However, there was a chance now under this new Act of having Rabies dealt with in a general manner. Every dog without a muzzle should be suspected, but not killed. The duration of the disease in a dog was brief, and from the earliest symptoms to the fatal termination it rarely exceeded six days. That was very important, for if a dog was kept under observation for fourteen days it would be pretty safe. There was no need to tell them that one of the earliest symptoms of approaching death was paralysis of the hind quarters. With regard to the inability to swallow, this only marked the course of the disease. It was curious this was not so in man. He could swallow, and was anxious to; but a fearful spasm comes over every muscle of respiration and closes the glottis. He had seen rabid dogs thrust their muzzle into water, but they could not swallow. Animals were able to swallow at the commencement of the malady. He thought now that he had replied to all, and was extremely obliged to them for listening to so much and so patiently. It was a question in which all were interested, though many scientific points in the malady had not been touched upon. The discussion had been very instructive, and he was exceedingly gratified to find their medical friends had assisted in elucidating certain points. With regard to Dr. Maclean's experience in India, that was very sad. How the disease was to be eradicated in India he could not tell. There they had caste and creed to contend with, which created a morbid sentimentality against putting animals to death. Everything was against them, simply because the people would not have animals killed. This prejudice on the part of the natives was almost insuperable. As to the vivisection question, he had himself had to suffer for his views respecting experiments on animals, and quite recently he had to resign his seat on the Dogs' Home Committee solely because he wrote an article in the *Nineteenth Century* on behalf of experimental pathology, and since he was a member of the Hydrophobia Commission he had had to run the gauntlet of the sentimentalists. It was not a matter of sentiment, however. Human life was of far more value than animal life. He thought if they could utilise animals for the preservation of human life, they were perfectly justified in making experiments. He con-

sidered the laws in relation to vivisection might be relaxed, but there was not much difficulty yet, and he did not think the Home Secretary would be likely to object to granting a license if reasonable ground was shown for experiments. Men were afraid to apply for a license, not so much, he thought, because of the difficulty of the system, but because of people being alarmed if the experimenter were a medical man. There was a sort of slur cast upon people who experimented on animals, and instead of being praised, as they should be, they were looked upon as torturers of animals. In conclusion, he (Dr. Fleming) thanked them very much. (Applause.)

Mr. WRAGG said he desired to propose a vote of thanks to Dr. Fleming for so kindly coming down and giving them such a splendid scientific address.

The PRESIDENT, in seconding the vote, said he could not sufficiently express his indebtedness to Dr. Fleming for acceding to his request to attend their meeting. They were all exceedingly obliged, and had passed a very pleasant afternoon.

The resolution was carried with cordiality, and

Dr. FLEMING, in expressing his acknowledgments for the compliment, remarked that that was his first appearance at such meetings since his recovery from illness, and he should be glad to come again. (Applause.)

A vote of thanks to the President for his able conduct in the chair brought the meeting to a close.

PROCEEDINGS OF THE THIRD GENERAL MEETING OF THE NATIONAL VETERINARY ASSOCIATION.

(Continued from page 150.)

The PRESIDENT, in announcing that the subject was open to discussion, said: It is scarcely necessary to say that our time is limited. I should myself like to say a few words, as I have, within the last twelve or fourteen years, seen as much of Swine Fever, perhaps, as any man in this country. I saw no less than three outbreaks on Saturday. Some twelve or fourteen years ago, my attention was first called to an outbreak which proceeded from this town, and in which a farmer lost two hundred pigs within the space of six weeks. Not one of those attacked recovered and within a very short distance from this place hundreds of pigs died within the short space of three months. But the question which I think of the greatest importance is that at the outset the disease was peculiarly fatal; but, whether the disease germs became naturally attenuated. or that the animals subsequently exposed to their influence were in a more healthy condition, it is a fact that the disease after a time assumed a much milder form, and many of the pigs recovered. I am very much inclined to think that both in Pleuro-pneumonia and in Swine Fever the disease lies in a latent form in the systems of some animals who have suffered from it, and that they are capable of infecting others. I had an instance of this in one of the cases I saw yesterday in a village where we have been getting fresh outbreaks of Swine Fever for months. Yesterday I was asked to investigate another case, in which a boar pig had been travelling about in a particular district; on inquiry, I learned that this pig, a very strong one of his class, had been coughing, sniffing, and unwell for some two or three months; he had been badly affected, in fact, with the pneumonic form of the disease for some weeks, and I am of opinion that he had disseiminated the verus of the disease in all directions. The question of disinfection is also a very important one. I believe that, as a rule, we do not sufficiently impress upon our clients the fact that they ought to disinfect more

freely. I am a great believer in boiling-water, besides whitewash, wherever it can be used. I am of opinion that a good deal of the mischief is due to the want of any equality of action on the part of the Local Authorities. One says, "You may slaughter as many as you like, and we will pay for them"; another says, "Take care they know we do not give compensation." As long as they (the Local Authority) will not put the Act in force, in my opinion, we shall never get rid of Swine Fever. It is absolutely necessary that we not only kill the infected animals, but also those that have been in contact with them; I believe that is the only way of getting rid of it.

Mr. ARCHIBALD ROBINSON: I unfortunately have not had the opportunity of reading the paper over. All that I wish to say in regard to the matter is that in the district of Baden inoculation has been successfully carried out. With regard to disinfection, it should be thoroughly attended to, and I quite agree with Mr. Hopkin in having all animals who die of the disease cremated.

Mr. MOIR: I shall not detain you long. I stated last year that "so long as slaughter is permissive, so long will this disease continue." As our President has stated, some Local Authorities are willing to carry out the provisions of the Act; others simply ignore them, and there is no doubt that in a great many districts where they will not carry out the law the pigs are hurried into the market and sold, and thus become fresh centres of contagion. I think we ought to impress upon the Privy Council the necessity of having one central authority from whom all orders ought to emanate, and that slaughter ought to be made compulsory, and not permissive. Another thing is, that in some places they appoint inspectors without regard to qualification, whether really fitted for the appointment or not. I do not know whether I should be out of place in reading an extract from a newspaper which shows how it is carried out in some places:—"Once upon a time, as the story goes, two individuals were discussing the keenness of their eyesight. One said he could see that animal, so objectionably familiar to man and beast, yclept a flea, on the top of St. Paul's Cathedral. This was a staggerer, but it was completely eclipsed by the still more remarkable keenness of sight of the other, who extinguished his imaginative rival by declaring he could see that identical flea wink! Some men can see objects at distances where they fail to present anything like form to the eyes of others. The sense of smell is, like other senses, more highly developed in the lower animals than in man. The same remark is to be made in reference to the sense of hearing. The following is a singular case in point:—Some few days ago, a well-known 'Vet.' was travelling with a constable in the upper part of somewhere in search of a pig, which the owner had reported to be slightly indisposed. The professional journey was made to ascertain whether the sick porker was suffering from an attack of Swine Fever, which has been raging with so much virulence of late. On their way to the sty, the constable was impressed with the statement of the 'Vet.' that no one understood Swine Fever better than himself. Suddenly a sonorous grunt was heard, 'Do you hear that'? said the 'Vet.' to the alarmed constable, 'That grunt is the unmistakable grunt of a case of Swine Fever; no pig would grunt like that unless he were suffering from the disease.' They stopped, listened, heard, and saw not. In tones from which the slightest trace of doubt had been entirely eliminated, the 'Vet.' said to the constable, 'Come, let us go back to the inn.' They went back. Forms were duly filled up, authorizing the slaughter of the grunter. The pig was sacrificed that other pigs in the locality should not go wrong." Now, I am sure, if this is true, and if inspection is carried out like that, how can we expect the disease to be eradicated? Unless some force is brought to bear upon the Local Authorities, and every animal is either isolated or slaughtered, so long will the disease continue.

Mr. MULVEY: There are one or two remarks I should like to make with reference to the incubative stage of the disease. I consider—and I am speaking from an experience of some five or six hundred cases—that the incubative stage is, in many cases, certainly longer than twelve days; that may be the mean, but I can give several cases in point in which one or two pigs have died in a certain sty, and others left, and five or six weeks afterwards those that were left have taken the disease and died. Again, I know one or two cases in which pigs have been brought from infected places and taken in a cart to other districts several miles away and in which there had never been any trace of this disease, and several weeks afterwards they have become affected with the disease and died, so that I certainly consider the incubative stage as given by the Professor is too restricted. In some serious cases I have met with, the skin lesions have been very slight—in fact, there have been scarcely any skin lesions at all. I am of opinion that we have just now one or two other diseases amongst pigs of a more simple character, that may be, and no doubt are, confounded with this disease. I allude more particularly to Urticaria and a disease locally called Measles, which is simple in its nature, characterised by a patchy eruption of the skin, slight increase of temperature, seldom any loss of appetite, but without doubt contagious, the disease generally terminating favourably in four or five days. In the County of Durham, etc., the orders of the Council are simply not carried out at all. The cases are reported to the police, it is their duty to call in an inspector, and then the case is done with; no other measures are taken. The policeman has to see the place whitewashed, and nothing else is done. I quite agree with those who say that the only means of getting rid of the virus of Swine Fever is by absolutely destroying all wooden erections; the emanations from the pigs so thoroughly percolate them that there is no doubt they would be enabled to hold the virus disease for any length of time.

Mr. PARKER: I think the pig castrators have a great deal to do with the spread of this disease. It is a question whether we can restrict these men from going about from place to place.

Mr. TRIGGER: I can confirm the remarks of the last speaker. I had a case strongly confirmatory of it in my own practice two years ago, when, at various distances from each other, there were outbreaks here and there, and I may tell you that singularly enough, the hog pigs were the first to be infected. All the pigs had been castrated by one castrator. I think there is no doubt that these men disseminate the virus, as I have had other cases than the one mentioned which confirm that view. With regard to the period of incubation, I look upon it as about twenty-one days. I have been an inspector fourteen years. A year or two ago outbreak after outbreak kept occurring. I knew the seat of the disease was a certain market, and the disease almost invariably broke out within about three weeks after market day. This market was in my own inspectorship, and I went down week after week, and although I saw pigs that certainly were suspicious, I never saw pigs I could seize, and that is a difficulty with which we have to contend. The length of incubation is so long you may have an infected centre, and you have not the power to seize the obnoxious pigs that are there. I think, somewhere about three weeks is the period of incubation.

Captain RUSSELL: I have great pleasure in endorsing the remarks of Mr. Trigger as to the period of incubation. Some pigs were purchased in my district from a pig-dealer; they fell ill and died of the disease from eighteen to twenty-two days after they were purchased. I can also endorse what he says about its being possible for them to carry the disease about with them.

Professor AXE: It was not my intention to enter into this discussion; but inasmuch as I have studied this question, and was the first to differentiate this disease from anything known, I feel that my conclusions and observa-

tions have been challenged. There certainly does not appear to be evidence of such a nature and extent as would warrant us in concluding that the incubative period is as long as twenty-one days. Isolated cases may have occurred of Swine Fever not having been detected until twenty-one days had elapsed from the time the pigs came into possession of the then owner; but the fact of its not having been detected does not warrant us in saying that the period of incubation is necessarily twenty-one days, since all other facts and observations point to about twelve. Some twelve years ago, I undertook the investigation of this question; not in an ordinary and casual way, but by the adoption of scientific measures. A number of experiments were performed, which were recorded in the pages of the *Veterinarian*. They consisted in determining the contagious or non-contagious nature of the disease. It was shown that when diseased animals were placed at some distance from healthy animals that the latter contracted the malady, and that the malady could be disseminated through the medium of the atmosphere. The next experiment referred to the capability of its being transmitted through the medium of ingestion. That was successful. Subsequently, inoculation was adopted, and in every case the incubative period was found to vary from three to five, or, at the longest, eight days. The length of the incubative period must rest upon facts obtained in a strictly scientific manner. It is not for us to say in these cases, where a man goes to market and purchases pigs, and keeps them three weeks without indications of illness, that those animals have not manifested symptoms of disease which would have been patent to an experienced eye. Therefore, I should ask you to receive with caution observations of a general nature.

Professor WALLEY: There are one or two remarks I would like to make in reference to the inquiry made by Mr. Hopkins. That is a point I had not time to enter into; I could not look up the necessary authorities on that point, and I preferred to leave the matter alone. As far as I am concerned, I have no proof as to whether it is imported or indigenous. With reference to the susceptibility of animals, I have made a remark that young pigs are more susceptible than others. I should, perhaps, have used a different word, and said that they are susceptible in proportion to their age and strength. At the present day, and with the present regulations, we have little chance of noticing these things. In reference to the use of the flesh, as touched upon by Mr. Hopkins, it is a very difficult question to determine whether you are or are not to condemn it; but I must say that whenever I find evidence of disease being present in the system by marked alterations in the tissues or skin, I advise that the flesh be condemned. I look upon it in a different light from Pleuro-pneumonia, as in Swine Fever the whole of the system is permeated by the virus, and the blood is materially altered throughout. I do not, of course, say that if the flesh is properly cooked it would be deleterious, but can you ensure this, especially with the poor? The remark made by the President with reference to boar pigs and castrators was a highly important one, and such matters should be well considered. Certainly the disease may be disseminated through the whole country by the methods mentioned by him. As to the incubative stage, I have no reason to withdraw from what I have said.

A vote of thanks was hereupon unanimously accorded to Professor Walley for the papers he had supplied.

Professor WALLEY: I need scarcely say I am extremely obliged to you for your kind acceptance of these papers. They are, as I have said, very fragmentary; you must, however, overlook their deficiencies. It is extremely difficult in a few days to write exhaustive papers on such subjects. My labour has been a great pleasure to me, and I hope that the discussion now concluded may be of use to every one of us.

The first day's meeting then terminated.

SECOND DAY'S SITTING.

MAJOR SUBJECT III.

ORIGIN OF DISEASES.

BY SIR F. FITZWYGRAM, BART., F.R.C.V.S.

1. *Classification of Diseases.*

DISEASES may be broadly divided into two classes, viz.—

1st. *Specific Diseases.*—Each Specific disease is marked by certain fixed and unchangeable features, which clearly distinguish it from any other disease, and which can only arise by propagation from the *original source.*

The only specific diseases affecting the horse are Influenza and Glanders and Farcy. Ophthalmia—sometimes called "Specific," in contradistinction to other less serious affections of the eye—is not a true Specific disease.

2nd. *Non-specific Diseases—i.e.*, diseases of spontaneous growth, such as constitutional disturbance in the lungs, liver, stomach, and other organs.

2. *Of Specific Diseases.*

So far as we can surmise—for positive knowledge has not been vouchsafed to us—the germs, or organisms, from which Specific diseases are developed are aboriginal creations.

It will probably be admitted that each seed or herb bearing seed after its kind is an aboriginal creation. No wheat can grow except from a wheat seed. No oak can grow unless there is an acorn.

Similarly, no Specific disease can be reproduced, unless there is a germ of that disease present.

No amount of suitable manure mixed with suitable soil will produce an oak, unless the germ of an oak exists in that soil.

Similarly, no amount of malaria or "nidus," suitable for the development of a Specific disease, will produce that disease, unless the germ of the disease is in the nidus.

If the germ of an oak is in a suitable soil, it will, under favourable climatic influences, develop into an oak. If the climatic influences are unfavourable, it will not develop into an oak, even though the soil is suitable.

Similarly, if the germ of a Specific disease is present in a suitable malarious nidus, it will, under circumstances favourable to its germination, develop into that Specific disease. If, on the other hand, circumstances are unsuitable to its development, it will lie dormant.

To take a well-known instance:—Let us substitute "seed" for "germ." The wheat seed found among the mummies of Egypt germinated freely, after a lapse of 3,000 years, when placed in a suitable soil and under favourable climatic influences; but its vitality had lain dormant until it found a suitable seed-bed.

Similarly, germs of disease may lie dormant for any number of years; and, so far as we know, or, rather, can surmise, their vitality is not destroyed by any lapse of years.

3. *Of Germs of Disease.*

What is the germ of each Specific disease? We do not know. Wherein lies the scent of flowers? We do not know. In regard to seeds and their produce it is somewhat different. We can see and handle seeds. We cannot handle the germs of disease; but in one or two instances it is possible to see them, and even to watch their growth, with the aid of the microscope. We only know, or at least believe, from the reproduction of Specific disease, that the germs of those diseases must exist.

Seeds may be dormant and produce no crop for any length of time, as in the case of the mummy wheat above mentioned, unless the accessory causes needed to produce germination are present. What are those causes?

In regard to seeds, we know the accessories needed to produce germination. Any gardener, any agriculturist, can tell you the accessories needed to produce germination in any particular seed. It is probable—only probable, for we are treading on the unknown—that the germs of Specific diseases, like the seeds of the fruits of the earth, *exist*—some almost everywhere, some only in particular countries, some only in restricted areas. But the germ of each disease needs certain special accessories to cause it to germinate. Germs of disease partake of the nature of fungi, and, as a general rule, require warmth, moisture, a close, confined atmosphere, to ensure germination.

4. *Of Foreign and Home Germs of Specific Diseases*

Germs of a Specific disease, like seeds, can only grow in a climate and soil suitable for their reproduction—at least, only to a certain extent. Some English seeds, for instance, will germinate, and produce a crop for one or two seasons, in a tropical climate. But the climate does not suit them; they dwindle and die out. Similarly, some foreign germs of disease may reproduce themselves for a year or two in this climate—*e.g.*, Cholera; but they soon die out. Others cannot germinate at all in this climate, *e.g.*, Yellow Fever.

5. *Of Home Germs of Specific Diseases.*

Some people talk of "stamping-out" diseases. Doubtless, it may be done as regards *Foreign* diseases, both in man and beast—*e.g.*, Cholera among men, Rinderpest among cattle.

But as regards those diseases, the germs of which have their habitat in this country—*e.g.*, Small Pox among men, Splenic Fever, Glanders, Farcy, etc., among the animal creation—it is not probable that it can ever be done.

You may keep a garden clean, you may pull up all the weeds, but if the garden is neglected only for a short time, the weeds natural to the soil—*i.e.*, those whose germs or seeds are in the soil—will soon reappear and grow again.

Similarly, germs of disease indigenous to, and thoroughly suited to germinate in, this climate will never die out. They will reproduce themselves whenever and wherever the accessories needed for their reproduction are present.

6. *Of Home Specific Diseases.*

The author believes that the germs of all Home diseases are present almost everywhere, and will develop themselves wherever causes favourable for their development are present. Noxious weeds suited to the climate are present almost everywhere, and will infest any garden or field which is not kept clean by good horticulture or agriculture. So, also, the germs of those diseases will develop and infest any house or stable which is not kept clean and well ventilated. But noxious weeds, though indigenous to the soil, and suitable to this climate, will not prevail where the husbandry is good, nor will the germs of Specific diseases develop to any great extent where proper sanitary precautions are adopted.

7. *Of the Growth of Germs.*

What are the conditions necessary to produce development in the germs of Specific diseases? Seeds reproduce themselves by germination in the earth. There is visible outgrowth. We do not—we cannot—understand the processes of growth. But we can see and easily recognise the result.

In the few cases in which germs of disease can be actually seen, and their growth watched, under the microscope, it has been found that they reproduce themselves in two ways—by division, the rod lengthening and dividing into two—and endogenously, by the formation of spores within the cells, their development and growth being attended by various kinds of fermentation.

Yeast is probably the best-known germ the reproduction of which is attended with fermentation. It will, therefore, serve well for the purpose of illustration. We know the conditions necessary to cause the fermentation and development of yeast.

1st. There must be a nidus or soil suitable for its development, such as dough.

2nd. There must be warmth.

3rd. There must be moisture.

4th. There must be a confined atmosphere

If any one of these conditions is wanting, the yeast will not germinate, or will do so imperfectly. It will be inactive. The dough will not be affected by it. The bread will be "as heavy as lead."

Now, the process of the growth or development of germs of a Specific disease is much the same. Before the germs of disease will develop in a house or stable, there must be a suitable nidus or seed-bed. There must also be a foul and confined atmosphere. The germs of disease are generally of the nature of fungi. They thrive in a foul atmosphere. They require warmth. They require a confined as well as a foul atmosphere. Draught hinders their germination. A plentiful supply of fresh air will, after a time, render their reproductive powers inert.

8. *Where do Germs of Disease come from?*

More or less, it is probable that the germs of disease are present almost everywhere in a dormant, *i.e.*, undeveloped, state. The foul, confined atmosphere of an unventilated drain is very suitable to their growth. If the air of an unventilated drain is admitted into a house or stable, the germs of disease may come with it. Water into which sewage has percolated is also very favourable to the development and growth of germs of disease. If water tainted by sewage is drunk by man or beast, the germs of disease will probably very soon make their presence felt.

9. *Of the Spreading of Specific Diseases.*

The question is often asked, Why, if Specific disease be due to local causes, are not all the men and all the animals subject to those causes affected? A similar question, with equal reason, might be asked, Why certain seeds germinate readily in certain soils under certain climatic influences? and why, in similar soils, under different climatic influences, they do not germinate? A similar question might also be asked of the advocates of the theory of the propagation of disease by infection and contagion.

The answer to these questions is the same. Different systems are not equally liable to be affected. Nay, more, the state of the system may vary from day to day, even from hour to hour. A man or an mal in good health, and with a good constitution, may long resist malarious influence. A delicate, ailing, susceptible system may soon be affected. Again, a man may be strong and hearty in the morning, his system may be able to resist noxious influences; he may return home hungry and fatigued, he may become susceptible. Again, he may resist malaria for days or weeks; his system may become lowered from a variety of causes, rendering him susceptible to malarious influence. A seed-bed may be dry and hard; seeds will not germinate: a shower of rain may come, followed by a warm sun, and soon the seed will germinate.

A simple illustration may, perhaps, help to explain what we mean. Take half-a-dozen sheets of paper, one of the best glazed, another of inferior quality, another rough, and another of whity-brown paper. Hang them up in a draught in a London fog for a few hours. Note the amount of "blacks" which have adhered to each. To the best glazed few, if any, blacks will be found adhering, and these will be easily blown off. More blacks will be adhering to the inferior paper; still more to the rough paper (and it will not be easy to dislodge them); whilst to the poor whity-brown paper almost every black will be adhering.

Now, let us reduce the state of "health." Suppose the day changes from dry to damp. Examine the papers. Even the best glazed paper will have become somewhat moist, and many blacks will be adhering to it, and will not be easily blown off; and so, in increasing proportion, until we come to the whity-brown paper, which has absorbed all the moisture, and in which every black will be sticking fast, and cannot be dislodged.

All, however, have suffered from lowering of tone. And so it is in regard to men and animals subjected to noxious influences.

The germs, or particles, may find a suitable nidus in one system which they do not find in another; and the conditions of the system in which they find a nidus may, and do, vary from day to day, and from hour to hour.

10. *Conclusion: Specific Diseases.*

From the above it will be seen that though Specific diseases are not of spontaneous origin, yet they prevail mainly from causes which may fairly be termed preventible, *i.e.*, from neglect of good sanitary precautions.

Specific diseases are generally regarded as infectious or contagious. No doubt, they may be propagated by infection or contagion. But such is more rarely the case than is generally supposed. Similar causes produce similar effects, and are liable to produce disease among all the men or animals subject to their influence. It is but seldom that such diseases are "caught," to use a conventional expression, from one man or animal to another, if the sanitary arrangements in the house or stable are good.

11. *Origin of Non-Specific, otherwise termed Spontaneous, Diseases.*

Non-Specific, otherwise termed Spontaneous, diseases are those which cannot be transferred from one living subject to another by inoculation or infection, such as coughs, colds, fevers, affections of the lungs, liver, kidneys, and stomach. There may be, and there is, great similarity in cases of spontaneous growth, but there is no absolute identity, as in Specific diseases.

It is generally admitted that such diseases arise from causes peculiar to the individual affected. They are generally due to bad stable-management, such as want of ventilation, bad food, over-feeding, want of exercise, and neglect in grooming, especially in allowing a horse, when wet or heated, to stand in the stable without being cleaned and dried. All such causes produce ill health and so-called Spontaneous diseases.

The PRESIDENT: I am sorry we have not here this morning the writer of the paper. He, unfortunately, has an important appointment at Portsmouth, so that he has left the paper in your hands. I hope we shall have a good discussion. I will now ask Professor Axe to open it.

Professor AXE: Mr. President and Gentlemen,—I must confess to feeling myself somewhat in a difficulty in introducing to you the subject of this paper. During the short time it has been in my hands I have felt much perplexed to know how I shall reconcile the title with the text, and, in default, whether I shall ask you to consider the subject-matter of the latter as it comes before me, or introduce anew the question involved in the former. The origin of

disease is a very wide and complex subject, and its far-reaching ramifications and weighty bearings involve a vast amount of thought and patient work. It is not a subject which can be disposed of in the short space of time allotted to the task I have the pleasing duty to perform, and if it were otherwise it would not be complimentary to the essayist to depart from the real matter of the paper, which appears to me to deal with the important question of the relation of micro-organisms to disease, rather than with the "origin of diseases," as set forth in the title. The origin of diseases cannot, I venture to think, be fully and effectually treated without considering the many intricate collateral questions bordering on the evolution of life and concerning also the laws of health, the constitutional proclivities of individuals and races, and, above all, the causes which determine the power of the parent to imbue the offspring with morbid propensities, as shown by the hereditary transmission of disease—these and many other considerations affecting the stability of animal life and health, not the least important among which is the relation of micro-organisms to disease, are, I venture to think, necessary considerations in dealing with this great question. I must not, however, attempt to break this new, though fertile, ground; and, moreover, it seems to me that I shall best be consulting the spirit and intention of the author by dealing with the paper as it appears before you. In no department of medicine is there a subject which in recent times has called forth more scientific energy, and led to such great and useful results, as the study of micro-organisms in relation to disease; and I know no question to which the attention of this meeting could have been directed with a greater prospect of gain than an exhaustive account of that earnest work in which human and comparative pathologists alike have engaged during the past twenty years for the purpose of elucidating the pathogenic relations of bacterial life. Likening the animal body to a machine, disease may be regarded as an interruption or suspension of the normal activity of one or more of its many parts. The causes and phenomena displayed in the course of disease differ, naturally, in different affections; but although this is so, there are certain disorders which possess many characters in common, and, as the honourable baronet has suggested, enable us to divide or classify them into such as are of a specific nature and others that are non-specific. But the author of the paper, while departing from all recognised authority in attributing to the horse only two specific diseases—viz., Influenza and Glanders—does not attempt to formulate the fundamental characters which constitute and distinguish a specific affection. Before attempting to refute this limited liability of the horse to specific maladies, permit me to supply this omission. Specific diseases, then, originate in specific causes—*i.e.*, causes which no common conditions have the power to produce, however much they may contribute to their natural existence. 2. They are transmissible from one animal to another, and are consequently infectious or contagious, or both. 3. They have a period of incubation more or less definite. 4. They are each marked by fixed and characteristic clinical phenomena. 5. Their anatomical and pathological changes are constant both in locality and in nature. 6. Each is the result of a specific living form whose natural habitat is the living body. This latter feature may be a matter of pure inference so far as refers to some specific disorders, but it is a fact in regard to others, established by methods as reliable as those employed in physical science, and it is difficult to escape from the logical conclusion that the statement is true of the whole. Coming to common or non-specific affections, we find a different order of things to prevail. Here, in a large sense, each particular disease is common to a number and variety of causes, and each cause is capable of inducing a considerable diversity of disorders. In illustration of the first proposition, it is only needful to remark how dissimilar are the causes which occasion Pneumonia—exposure to

cold, mechanical violence, and the inhalation of irritating fumes may be mentioned as familiar examples; while proof of the second may be found in that wide range of disorders which follow upon excessive alimentation, such as functional derangement of the stomach, organic changes in the liver and kidneys, and structural alterations in the heart and arteries. We see, therefore, that a specific disease is etiologically and pathologically concerned with a particular thing—a living organism—and no other, while a non-specific affection has wider and more diverse causative relations. Having now defined the differential characters of these two classes of disorders, it will be convenient here to test the statement of the honourable baronet in regard to the receptivity of the horse to specific affections. Influenza and Glanders, it is affirmed, are the only maladies of this kind which affect the horse, but, it may be asked, in what respect do they depart from Rabies, Anthrax, and Strangles, all equine maladies, and, according to the definition just given, essentially specific? Nay, Strangles may be said to be even more specific as an equine disorder than Glanders itself, inasmuch as, so far as we at present know, it is confined to the horse and ass, while Glanders has much wider zoological affinities, embracing in its range not only horses and asses, but man, goats, and other creatures. With reference to the origin of specific diseases, the accumulated evidence of the past fifteen years has placed the question beyond dispute, and by common consent it is now admitted that these affections are the outcome of a struggle between animal and bacterial life. Whether pathogenic bacteria are aboriginal creations, or evolved from other and simpler living forms, is a subject of the highest interest to the biologist and the evolutionist, but need not engage us here, further than to say that there is no evidence which I am aware of to lead us to the conclusion that disease organisms were separately created and perpetuated as such since the origin of all things. It is, on the other hand, certain that they are not immutable either in their morphology or pernicious properties, as modern research has abundantly shown in the modification of form and attenuation they are capable of undergoing as shown by artificial cultivation. In this latter connection we have the high authority of Pasteur, who has published a large mass of evidence to show how the virus of some of these specific disorders can, by certain methods, be greatly enfeebled or mitigated, and thus be reduced to the condition of a protective "vaccine." That all forms of bacterial, and, for that matter, every other description, of life are the offspring of pre-existing organisms or ancestors typical of themselves is beyond controversy. The stale and stupid doctrine of spontaneous generation or new formation is happily dead and buried in the night of our own time. By the most eloquent and unimpeachable proof, specific diseases have been demonstrated to arise out of living entities or forms of a bacterial nature, each disease having its peculiar parasite, in some cases limited in its zoological range to particular species, in others extending to many—in both failing to take effect in some individuals, but flourishing in the majority. All this points to the now well-established conclusion that each species of microbe requires for its propagation, growth, and development a peculiar and suitable soil containing all the necessary organic and inorganic elements of nutrition, as well as a suitable environment and temperature. And it is a matter of fact that the withdrawal of the one or the fouling of the other, either by the physiological products of the organism itself, or from other causes, will result in the decay and death of the microphyte. This is as true of the lowest organism as it is of the highest. But while we admit the truth of these elementary propositions, we cannot endorse the everlasting nature either of developed bacteria or their germs. "Germs of disease," says the essayist, "may lie dormant for any number of years, and their vitality is not destroyed by any lapse of years." I venture to think that this state-

ment is not consistent with observed facts bearing upon the life-history of micro-organisms, and that it is directly controverted by the history of specific disorders. Everything that lives must, sooner or later, die. No organism, simple or complex, can continue indefinitely to antagonise external resistances. Germs of disease, no less than the organisms which grow out of them, are, like all other forms of life, amenable to the ordinary forces of nature, and in the absence of the special conditions of their existence as provided by the living host must, sooner or later, perish. We cannot reason from the thickly encrusted germ of wheat to the delicate mass of naked protoplasm composing a bacterium, any more than we can logically compare the security of the armour-clad warrior with the naked savage. We recognise the resisting vitality which some disease germs oppose to extremes of heat and cold outside their living host, and at the same time also the certainty with which developed bacteria are destroyed by drying and freezing. The teachings of the past have shown conclusively that in this climate of ours, with its ever-alternating humidity and dryness, cold and heat, pathogenic bacteria of animals rarely for long survive the overpowering and disintegrating influence of the septic. It is true that the microbes of Anthrax and perhaps some other infectious disorders, as Influenza, must ever continue to ravage our herds and studs, not, however, by virtue of the superior vitality or invulnerable nature of their germs, but on account of their power to germinate in certain natural soils outside the living host. If evidence were wanting in confirmation of the instability of disease germs apart from the animal body, it is to be found in the circumstances of imported diseases as well as in the daily routine of our practice. Cattle Plague and Sheep Pox have again and again spread abroad each their respective germs, only, however, to perish where the living habitat was not soon accessible; and our daily experience of Foot-and-mouth Disease, Glanders, and Pleuro-pneumonia emphasises the fact, and demonstrates the great destructibility of disease germs by natural forces. It is indeed to Nature's hygiene that we owe much of our success in stamping out these virulent affections. But for the aid thus rendered, disease germs like septic organisms would become ubiquitous and life impossible. "What are the germs of specific diseases?" This is the question which the honourable baronet next submits to us, and I must confess to feeling a pang of sympathy for the many untiring workers in this field of science when I am told, in emphatic and unqualified terms, "We do not know." As a matter of fact, there is no biological question concerning which so much real knowledge has been acquired during the last decade as that relating to the nature, morphology, and physiology of pathogenic organisms. In this connection it is now well-established that they are fractions of the vegetable kingdom—minute masses of protoplasm invested in a cellulose membrane devoid of chlorophyll—unicellular organisms whose mode of reproduction and growth and peculiarities of nutrition clearly characterise them as fungi. So much are we acquainted with these microscopic plants, that they have already been divided into species, isolated and cultivated outside the living body, and even attenuated or mitigated in their pernicious properties. The honourable baronet suggests that we cannot handle the germs of disease; but it will be obvious to you from what I have just stated that it is to our power of handling them that we owe all our present knowledge of their morphological characters, chemical reactions, and relations to the specific diseases. It is perfectly true that they are intangible, as they are invisible, but just as the microscope is to the eye so are needles and pipettes to the hand. Our power of handling disease germs is abundantly shown in the fractional method of cultivation by which one species of bacteria may be separated from another with at much precision as beans are isolated from peas. With reference to stamping out disease, it appears to me there are certain contagious animal

disorders which, as I have previously remarked, we cannot hope to banish from our land, for the reason already rendered that the microbes to which they are referable, find the conditions of their development and propagation in the soil, which, like a seed-bed, affords a constant supply of spores. This is clearly the case in regard to Anthrax organisms, and possibly also to some others. But when we come to deal with such affections as Foot-and-mouth Disease, Pleuro-pneumonia, Pig Typhoid, and Glanders, we are assured by daily experience that their complete eradication only awaits the prompt and vigorous exercise of a sound and efficient sanitary service. In this connection I do not hesitate to affirm that each and all the several diseases last referred to exist on our island by mere sufferance, and denote, if anything at all, a painful disregard of the advanced teachings of sanitary science. To say it is beyond our power to stamp out the plagues now devastating our herds and flocks and studs is tantamount to ignoring the evidence of our daily experience, which clearly goes to show that by a judicious circumscription of the areas of disease and the application of strictly scientific methods, the spread of contagion is not only capable of being arrested, but the virus itself destroyed. This has been proved again and again in connection with each of the diseases referred to in their local manifestation, and the general application of the same principles would sooner or later exterminate the whole group. Nothing can be more clearly demonstrative of the efficacy of well-directed sanitary administration than the extinction of Cattle Plague and the more recent subjection of Foot-and-mouth Disease ; and if the hands of Mr. Chaplin were not fettered by his less resolute colleagues, I entertain no doubt that, under the guidance of the able chief of the Veterinary Department, all these virulent affections would in five years become matters of history. To the statement that "the germs of disease indigenous to and thoroughly suited to germinate in this country will never die out," the essayist himself supplies an appropriate answer when he further remarks that "noxious weeds, though indigenous to the soil and suitable to this climate, will not prevail where the husbandry is good, nor will the germs of disease develop to any extent where proper sanitary precautions are adopted" ; and he emphasises the contradiction when he observes that "specific diseases prevail mainly from causes which may fairly be termed preventible—*i.e.*, from neglect of good sanitary precautions." Indeed the honourable baronet disproves his own case with admirable clearness and ability. To the suggestion that "specific diseases are rarely propagated by infection and contagion," I can simply say that with disease germs, admittedly the cause, I am quite unable to understand their dissemination in any other way.

(To be continued.)

GLASGOW VETERINARY COLLEGE

THE summer session of this institution terminated on the 10th July, and on 15th, 16th, 23rd, and 24th July, the oral examinations of the Royal College of Veterinary Surgeons were conducted within the museum of the college. The Board of Examiners included Mr. George Fleming, LL.D., F.R.C.V.S. ; Mr. J. Roalfe Cox, F.R.C.V.S. ; Professor Duguid, F.R.C.V.S. ; Professor Pritchard, M.R.C.V.S. ; Mr. J. Vaughan, F.R.C.V.S. ; and Mr. Finlay Dun, F.R.C.V.S., London ; Mr. W. A. Taylor, F.R.C.V.S., Manchester ; Mr. W. B. Walters, F.R.C.V.S., Army Veterinary Department ; Mr. George A. Banham, F.R.C.V.S., Cambridge ; Mr. Archibald Robinson, F.R.C.V.S., Greenock ; and Mr. Richard Rutherford, F.R.C.V.S., Edinburgh. The following gentlemen were also present as *ex officio* members, viz., Principal M'Call, Professors Cox, Macqueen and Limont, Glasgow Veterinary College. Twenty-five students presented themselves for the "A" or first examination,

and of this number eighteen were successful in passing—viz., Messrs. James Borrowman, Auchtermuchty, Fife; Alexander Veitch, Kilwinning, Ayrshire; David Imrie, Strathbungo, Renfrewshire; Hector Munroe, Fearn, Ross-shire; William B. Gardner, Ballymena; Arthur E. M'Connell, Londonderry; John Forbes, Bellshill, Lanarkshire; Charles B. Freeman, Dublin; Andrew K. Hart, Glasgow; Llewellyn Crook, Eccles, Lancashire; Robert Hamilton, Lanark; John Ferguson, Alyth; John L. Orr, Belfast; James M. Stewart, Paisley; John R. O. Reali, Cashel, Tipperary; William Robb, Glasgow; John C. M'Crindle, Hillhead, Glasgow; Alfred Mackenzie, Govan. Nine students were examined for the "B" examination, and the following passed—viz., Messrs. John Macfarlane, Gartmore, Perthshire; James D. Miller, Ardgour, Argyllshire; Frederick George Warmington, Shrewley, Warwickshire; John Campbell, Rutherglen; and Alexander B. Baird, Rutherglen. The following gentlemen obtained the diploma of the Royal College of Veterinary Surgeons:—Messrs. Robert S. Thomson, Kirkwall, Orkney; Robert Clunas, Auldearn, Nairn; Benjamin Cook, Swansea, South Wales; William H. Dalrymple, Stranraer, Wigtownshire; John Brown, Lesmahagow; Gavin Miller, Glenluce, Wigtownshire; Alexander Paton, Troon, Ayrshire; Donald Wooley, Brodick, Buteshire; James Gibson, Biggar, Lanarkshire. Medals granted by the Highland and Agricultural Society of Scotland, Principal M'Call, and certificates of merit by the college, were awarded in the different branches of study as follows:—*Botany.*—Medallist—Mr. John Forbes. First-class certificates—Messrs. M'Crindle, Stewart, Hart, and Borrowman. Second-class certificates—Messrs. Imrie, Robb, Gardner, and Orr. *Chemistry.*—Medallist—Mr. John L. Orr. First-class certificates—Messrs. Forbes, M'Crindle, and Gardner. Second-class certificates—Messrs. Imrie, Ferguson, Robb, Stewart, and M'Connell. *Materia Medica.*—Medallist—Mr. James M. Stewart. First-class certificates—Messrs. Hart, Robb, and Imrie. Second-class certificates—Messrs. Forbes and Ferguson. Best oral examination in botany, chemistry, and materia medica, session 1884-5, gold medal (Principal M'Call)—Mr. John Kernohan, Ballymena. At the close of the examinations the secretary to the Board of Examiners intimated that Messrs. Stewart, Orr, Ferguson, Hart, Freeman, Borrowman, and M'Farlane had passed with great credit.

Army Veterinary Department.

Gazette, August 27th.

Veterinary Surgeon A. C. Webb, to be Veterinary Surgeon, First Class.

Gazette, September 7th.

Veterinary Surgeon, First Class, Charles G. H. Reilly has been placed on retired pay, on account of ill-health.

Veterinary Surgeon John Denis Edwards to be Veterinary Surgeon, First Class.

Mr. Arthur F. Appleton, now at Kurrachi, who last year passed in the lower and higher standards of Hindustani, and also in Sindi, is now studying Beloochi.

Obituary.

WE have to record the death of W. T. Stanley, M.R.C.V.S., of Leamington, on August 23rd, aged 75 years. Mr. Stanley was one of the best known and

most respected practitioners in the Midland Counties, where he enjoyed, for nearly half a century, the esteem and confidence of all with whom he came into professional contact. He graduated in 1831.

Another respected and yet older member of the profession is reported as dead. Mr. E. Bailey, M.R.C.V.S., of Leicester, who graduated so long ago as 1825, died recently at the advanced age of 86 years.

The deaths are also announced of W. Bromley, M.R.C.V.S., of Lancaster; and W. Louden, M.R.C.V.S., Co. Kildare, who died from an accident to his spine.

Mr. Sampson Gamgee, M.R.C.V.S., M.R.C.S., one of the leading surgical operators of Birmingham, died somewhat unexpectedly on September 18th at his residence in Broad Street, at the comparatively early age of 59. A few weeks ago Mr. Gamgee was enjoying a short holiday in Devonshire, when he slipped and injured his hip so badly that he had to be brought home. The shock, combined with the lowering effects of his treatment, appears to have developed a latent affection of the kidneys, to which he finally succumbed. He was a son of Mr. Gamgee, the well-known veterinary authority of Edinburgh, and devoted himself originally to the study of his father's branch of the medical profession, entering the Royal Veterinary College as a student, and graduating in 1849. He then studied human medicine and surgery, and obtained his diploma with distinction. He had lived for several years in Italy and Paris, and thus acquired remarkable fluency in various continental languages and dialects. He was afterwards house-surgeon at University College, London, and was Liston prize essayist in 1853. In the following year he took the degree of M.R.C.S., London, and volunteered for medical service in the Crimea. After serving as staff-surgeon in the Royal Navy, he became assistant-surgeon at the Royal Free Hospital. In 1857 he removed to Birmingham, where, after a lengthened and at first unsuccessful contest, he was appointed surgeon to the Queen's Hospital. Here he distinguished himself by his zeal for hospital reform and extension, and especially by his success in interesting the working classes in the work of the hospital. It is to his initiative that is due the local Saturday hospital workshop collections, which bring in some £3,000 or £4,000 every year; and a public testimonial not long since was presented to him in recognition of his services in connection with that movement. Mr. Gamgee was a brilliant operator, a fluent speaker, and a ready writer. For one of his papers on amputation of the hip-joint he was made foreign corresponding member of the Surgical Society of Paris. He was also a member of the Royal Academy of Medicine of Rome, and an F.R.S. of Edinburgh. He never ceased to take an interest in his first profession, and last year the success of the meeting of the National Veterinary Association at Birmingham was greatly due to his endeavours to ensure it a good reception, as well as to the part he took in its discussions.

The veterinary profession has lost a kind friend by the death, from Cancer of the tongue, of Dr. Wakley, editor of *The Lancet*. For the quarter of a century during which he managed that very important and influential medical journal, he gave frequent and marked evidence of the interest he always took in the progress of veterinary science, either by editorial articles and comments, genial and encouraging notices of veterinary works, or by allowing the communications of members of our profession to appear—often prominently—in his periodical. Thoroughly comprehending the importance of animal medicine, he was one of its warmest advocates and supporters, while he was no less a staunch promoter of humanity to animals. It is needless to say that, in his editorial capacity, he greatly benefitted human medicine.

Parliamentary Intelligence.

House of Commons, September 6th.

THE VETERINARY SURGEON TO THE ROYAL IRISH CONSTABULARY.

In reply to Mr. SEXTON, the ATTORNEY-GENERAL for IRELAND said: No appointment has yet been made to the vacant veterinary-surgeonship to the Royal Irish Constabulary. Although I believe this appointment has been hitherto held by a retired army veterinary surgeon, I understand that there is no rule restricting it to that class. The whole matter of the appointment is at present under the consideration of my right hon. friend the Chief Secretary; and I think I can say that he will not allow any consideration or practice to prevent the selection of a thoroughly competent and efficient person.

September 7th.

CATTLE DISEASE.

Mr. TAPLING asked the Chancellor of the Duchy of Lancaster whether his attention had been called to the recent outbreak of Splenic Apoplexy among cattle at Arnesby, in Leicestershire; whether, of the men who were attending on the diseased cattle, one had since died of blood-poisoning, consequent upon contact with one of the animals, and several others had been taken seriously ill with similar symptoms; and whether the Government would consider the advisability of taking steps to have that particular form of disease included within the limits of the Contagious Diseases (Animals) Act.

Lord J. MANNERS: The attention of the Agricultural Department has been called to the recent outbreak of Anthrax among cattle at Arnesby, and to the unfortunate results affecting certain persons who were employed about the diseased cattle. An Order of Council making provision for dealing with the disease is now under consideration.

DISEASE IN SHEEP AND OTHER ANIMALS.

Mr. CAREW asked the Chief Secretary to the Lord Lieutenant of Ireland whether it was a fact that, while a rigid system of inspection for the purpose of detecting disease in sheep and other animals was exercised at Dublin and other seaports, none was exercised at the fairs throughout the country; whether, in consequence purchasers at fairs who took their animals direct to Dublin, and before they had an opportunity of examining whether they were affected with disease, were often subjected to heavy fines; and whether, in view of the great danger of propagating disease under existing circumstances, he would order an extension of the system to the leading fairs to be held in the autumn.

Sir M. HICKS-BEACH: There is a strict system of inspection by Government veterinary inspectors at all ports of Ireland from which animals are shipped; and no animal can be shipped until certified to be free from disease. There is no such system of Government inspection at fairs, except that an inspector attends at Ballinasloe and other important fairs for the purpose of seeing that the provisions of the Order in Council as to cleansing and disinfection are carried out by the railway company, and to prevent overcrowding of animals in trucks. In Ireland, as in England, the districts in which fairs are held are under the control of the local authorities, whose duty it is to enforce the provisions of the Contagious Diseases (Animals) Act, and for this purpose they can appoint such officers as they deem necessary. These officers have authority to seize and detain any diseased animal

exposed at a fair, and the person so exposing it is liable to a penalty. As regards the second paragraph of the question, I believe the cases in which penalties have been imposed in Dublin under the circumstances mentioned are not numerous.

Notes and News.

INOCULATION OF RABIES.—With the virus taken from the spinal cord of a dog which had died of Hydrophobia in the Stockholm Veterinary Institute, three dogs were inoculated by Pasteur's method. To render it more certain, the meninges were chosen for the seat of operation. The dogs were carefully selected as being totally free from bites by other dogs which might have been suffering from Rabies. The inoculation wounds healed after two days, and the dogs seemed quite healthy and lively. The sixteenth day after the operation, two of them showed symptoms of Rabies, and the third followed two days later. The first two dogs had fully-developed Rabies sixty days after the first symptoms had appeared. To save the third dog unnecessary suffering, he was killed as soon as he developed decided symptoms of Rabies.

HORSE DISEASE ON THE AMERICAN PLAINS.—At last (says the writer of an article, "The Cow-boy at Home," in the *Cornhill Magazine* for September) we came in sight of a small wooden shanty standing apart from a long line of tumble-down open sheds and a roughly constructed enclosure or "corrall," but, before we reached it, we passed a heap of about forty dead horses piled up together, the most revolting, pitiful spectacle imaginable, and standing listlessly, or moving about with staggering gait, were about twice as many more still living creatures, with a peculiar look and manner about them such as I had never seen before, and most of whom must surely soon be dragged to the big heap close by. But what on earth did it all mean? It seemed so strange to suddenly come across this gruesome sight on the lone prairie. I soon learnt the explanation. A weed called "loco" has of late years largely increased in some of the cattle ranges of Texas and the Indian territory, owing probably to an increase in the rainfall; it has a mysterious habit of appearing suddenly in places where it was before unknown, and, given a dry season, of as suddenly disappearing. During the summer, when the prairie is a fair expanse of waving grass, lit up with bright flowers, both horses and cattle instinctively avoid it, but when in the fall of the year the grass becomes scarce in overstocked regions, and when all around assumes a brown and burnt-up appearance, it stands out conspicuously and temptingly green, its long, soft, velvety leaves rising in a bunch from six inches to a foot off the ground. Then the hungry creatures begin by nibbling, suspiciously and stealthily, at the seductive plant, but very soon become reckless, and eagerly and greedily devour all that comes in their way. And now, if the mania cannot be nipped in the bud by a sufficiency of good strong food, the animal is doomed, for he has become a confirmed "loco-eater." He will rapidly become thin, and lose all control over his movements; he will be subject to frequent fits, during which he lies on the ground groaning and foaming at the mouth: he throws himself about without reason; rears up or runs round in small circles when you attempt to mount him; his eyes turn dull and stupid; in short, he gives you the impression of being bereft of his senses. Specimens of "loco" have been subjected to analysis by experts in Washington and in Edinburgh, but without anything injurious being discovered in it. It is possible that some minute animalculæ may be the cause of the mischief, but up to the present its disastrous effects only are known, for this pernicious weed causes periodically the death of thousands of horses

and cattle. Here, then, was the clue to the miserable appearance of these wretched suffering creatures. More severely punished than their human counterpart, the opium-eater, they had paid, or were paying, with their lives the penalty of their devotion to the drug. Out of about 250 "locoed" horses, which had been driven in the fall from the region where "loco" flourished, but ninety odd head had wintered. The carcases of the rest were strewn about the boggy bottoms of the creek, whither they had dragged themselves to quench their last raging thirst, and those that had died in too close proximity to the shanty in which the boys lived had been heaped up in a small hollow, in order to mitigate the pestilential stench which arose from them. Right glad I was to leave such scenes after a couple of days spent in preparing harness, saddlery, and mess-waggon for the march.

RABIES IN EGYPT.—The existence of this disease in Egypt has often been questioned; but there can be no doubt that it manifests itself now and again. Mr. Case, Army Veterinary Department, reports the case of a dog belonging to a soldier at Abbassiyeh, which he found affected with the dumb form of Rabies. The animal was a fox-terrier, and was to have been destroyed, but it contrived to escape and was found dead next day in the desert.

OHIO STATE VETERINARY MEDICAL ASSOCIATION.—At the last meeting of this Association, held at Drayton, Ohio, Dr. Fleming was elected an honorary member.

CONTAGIOUS PLEURO-PNEUMONIA AT QUEBEC.—A serious outbreak of this disease has taken place in a valuable herd of cattle in the quarantine station at Quebec, which contained also other herds, the value of which was estimated at 300,000 dollars. The infected herd had been imported from Scotland, through a dealer in Kirkcudbrightshire, on whose farm the disease has also appeared; this herd consisted of fifty-seven head of Galloways.

BOMBAY VETERINARY COLLEGE.—A new Veterinary College has been instituted by the Indian Government at Bombay for the instruction of natives in veterinary medicine and surgery, and J. H. Steel, Army Veterinary Department, has been appointed its superintendent. Good results are anticipated from this school, and under the energetic and able management of Mr. Steel these results are certain to be realised.

VETERINARY INSTITUTE IN MELBOURNE.—While the Victoria Council of Agriculture are discussing the necessity there is for founding a Veterinary College at Melbourne, Australia, Mr. Kendal has erected an institute or infirmary on a large scale, for the reception of sick, lame, and injured animals. From the account received of the opening ceremony, the establishment starts under very favourable auspices. Mr. Kendal purposes establishing a veterinary class for young men.

THE LATE MR. GLOAG.—We learn that subscriptions are being collected for the purpose of placing a stained-glass window to the memory of J. W. Gloag (whose death was noticed in last month's JOURNAL), in St. Paul's Parish Church, Dublin, of which he was for many years Churchwarden and Secretary of the Vestry. Subscriptions are not to exceed half-a-guinea and are received by Mr. Crozier, 1, Montpellier Hill, Dublin.

THE METROPOLITAN POLICE AND DOGS.—The Chief Commissioner of Police has issued the following notice to the police force:—"Dogs.—With reference to various statements recently published conveying the impression that the majority of the dogs killed in the streets of London by the police are in a healthy condition, and not subject to disease or Rabies, the following return of dogs killed by police during the week ended 10th inst., with the opinion of

a veterinary surgeon as to the condition of the animals at the time they were killed, is given as an example of the cases dealt with. Number suffering from Rabies, 5; epilepsy, 7; fits, 2; convulsions, 1; healthy (conference when killed), 1: not examined, 1; a total of 17. This is the greatest number killed in one week since the 1st of July, 1885. Much stress has been laid on the fact that during last year only 60 dogs were found with Rabies at the Dogs' Home, and upon this has been based the supposition that the 365 dogs killed by police in the streets were not mad. That this is an erroneous conclusion can be readily comprehended when it is understood that the police captured over 25,000 dogs during the year 1885. Three hundred and sixty-five of these showed signs of Rabies at the time, and were killed in the places where they were found; while 60 which did not appear to be mad at the time developed signs of madness after arrival at the Dogs' Home, and were then killed."

Outbreak of Rabies in Cattle in Cheshire.—An outbreak of Rabies among a large herd of cattle in Cheshire is reported. It would appear that on the morning of the 18th of July a collie dog was observed worrying a herd of about 100 cattle in a field in the township of Aston. The dog belonged to a person in the town of Runcorn, some four miles distant, and was shot by Mr. Percival, the owner of the cattle, in the field where he was discovered attacking the animals. On August 12th one of these cows, which formed a majority of the herd, was attacked with Rabies and slaughtered, and two others have since had to be destroyed. Great excitement prevailed in the district, as it was feared that other herds might have been visited by the dog on his road to Aston during the night, he having escaped from his house at ten p.m. on the day previous to his appearance in the field where he was ultimately found on the early morning of the 18th of July. Altogether five cattle have been lost through the disease.

Horse Epizooty in New South Wales.—The *Sydney Mail* states that a fatal disease has broken out amongst horses on Coonong station, six very valuable animals having died, and others attacked. The Inspector of Stock and others of experience among horses know nothing of the nature of this disease, the like of which has never been known before in the district. A *post-mortem* examination showed that the lungs were much distended and charged with black blood. The tongue was much swollen. Amongst the horses which died was a draught stallion valued at 400 guineas.

Correspondence.

THE FELLOWSHIP EXAMINATION.

Sir,—My previous communication under this heading has been the subject of such a fierce attack at the last meeting of the Border Counties Society, that it necessitates me asking the privilege of your pages for a few words of explanation and reply to those strictures.

I believe the Secretary's intentions were in the interest of the Society in the action he took to bring the subject forward, and for this I give him due credit; but at the same time I would remind him that my action does not violate a single rule of the Society, and if Mr. Donald will take the trouble to look up precedents for my letter, commenting on some proceeding that is not published; but in this case the letter was written before the meeting's proceedings were published, so to me it was quite an open question whether the

remarks might not appear in print. If such a course is undesirable, as I admit it sometimes may be, I conceive that the proper course would be to introduce some prohibitive rule to that effect.

My chief reasons for reporting those remarks were that, coming from an Ex-Examiner of Fellows and an Ex-President of the R.C.V.S., I believed them to be authoritative and true, and was strongly of opinion it was fully time the matter should be thoroughly sifted out. A great deal has been said about the Fellowship Examination, and if it is the sham some would have us believe, the sooner it is exposed and put a stop to the better, say I. But if, on the other hand, these adverse remarks are not justifiable, it is full time some check should be put upon them.

I fail to see the necessity for the strong expressions of Messrs. Bell and Thompson, and I cannot see how they conceive my action to be "a breach of confidence," "unjustifiable," or "cowardly attacking this gentleman behind his back."

No person or Society was mentioned, and the anomalous comparison of the Fellows, which might have been offensive, was purposely omitted, and I can assure those gentlemen that I was much more disposed to believe that the gentleman referred to in my letter spoke his convictions with a desire to remedy a wrong, than I am to believe the inference conveyed by their remarks and action.

It was for a moral and conscientious reason, we were told, that he ceased to be an Examiner, and I altogether fail to see the necessity for the resolution condemning the letter as a "cowardly attack upon this gentleman."

The remarks were made at a fairly representative meeting, at which there were several local agriculturalists and other visitors, and with no signs of secrecy. I think the gentleman referred to in my letter is quite able to take care of himself without Messrs. Bell, Thompson, and Co. asking the public to believe that he made a deliberate misstatement of facts.

I am not a little surprised to find Mr. Greaves condemning my letter as "un-English" and "ungentlemanly," when, just about the same time, he was guilty (if guilty it be) of the same offence towards the Manchester Society.

"M.R.C.V.S."

"TIPPING."

DEAR SIR,—I do not think that Mr. Banham's remarks on "tipping," at the meeting of the Eastern Counties Veterinary Association, ought to be allowed to pass without protest.

If such a system as he refers to prevails in the profession, in London or elsewhere, I am not sure that he has not done well in exposing it. Upon that I will not venture to pass an opinion. If, however, the profession is not guilty of such dishonourable conduct, or even if only a small proportion of it is guilty, surely Mr. Banham has departed very far from his duty in bringing such monstrous charges against honest men, unless he is prepared with ample proof in support of his statements. I have now been in practice in England in three distinct towns, far removed from each other, and it seems very strange, to say the least of it, that if such a custom does exist, no servant has yet asked me what percentage I gave, or whether I gave any or not. The only inference I can make, from my own experience, is that Mr. Banham is, to put it mildly, mistaken or misinformed. That veterinary surgeons—myself among the number—give gratuities, I am not ashamed to confess. What I most emphatically and indignantly deny is, that "the tradesman (!) (from this reference I gather that Mr. Banham looks upon a veterinary surgeon, who I thought was a professional man, as a tradesman) puts his hand in his client's

pocket to pay the servant." The fact that the attention of a veterinary surgeon is required at a stable or byre involves extra work for the servant in charge, and, if we are to cure our patients quickly, which is the only path to a successful career, we must have the sympathy of the groom or cowman, and in nineteen cases out of twenty that can be secured only by a gratuity. But what a preposterous inference to assume that that gratuity comes out of the client's pocket!

I frequently give or promise the gratuity in the presence of my client, from whom I have nothing to conceal. I give it as I do to a railway porter, waiter at an hotel, or servant of my friend at whose house I had been a guest, *out of my own pocket.*

In the administration of medicine, or the application of blisters, bandages and all other details in daily practice, a veterinary surgeon is spared much trouble by the cheerful help of a groom. These, and many other little attentions which make his duties lighter and more pleasant, surely demand, or at least deserve, acknowledgment. At all events, if not acknowledged, these civilities will not be long continued. Doctors give gratuities. I wonder if Mr. Banham thinks they come out of the patients' pockets!! In fact, who does not give gratuities?

If Mr. Banham is attacking the custom, I heartily agree with him, and would do anything in my power to abolish a system so unpleasant to the donor and demeaning to the recipient. But why single out our profession as the only culprit?

I have spent more than half of my life in America, where gratuities are neither given nor expected, much to the advantage of all concerned. So long, however, as it exists in this country, we must bow to it.

I hope some more experienced member of the profession will assist me in meeting this—what I will continue to believe until proved—unjust accusation.

Bromley, Kent, *September 6th*, 1886. J. FRASER.

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from W. D. Gunn, A.V.D., Rawul Pindi; R. W. Burke, A.V.D., Cawnpore; J. Fraser, Bromley; W. Broughton, Leeds; "M.R.C.V.S."; A. Broad, London; A. W. Hill, London; W. C. Fair, Cleveland, Ohio; C. Gresty, Newcastle-on-Tyne; C. Cunningham, Slateford; F. Raymond, A.V.D., Woolwich.

BOOKS AND PAMPHLETS: Encyklopedie der Gesammten Thierheilkunde und Thierzucht; Bulletin et Mémoires de la Société Centrale de Médecine Vétérinaires; *E. Imlin*, Viehseuchenbulletin von Elsass-Lothringen; *Leisering, Hartman, und Lungwitz*, Der Fuss des Pferdes in Rücksicht auf Bau, Verrichtungen, und Hufbeschlag.

JOURNALS, ETC.: *Journal of National Agricultural Society of Victoria; Nebraska Farmer; Annales de Méd. Vétérinaire; Recueil de Méd. Vétérinaire; Wochenschrift für Thierheilkunde und Viehzucht; Der Hufschmied; Der Thierarzt; Revue Vétérinaire; Journal de Méd. Vétérinaire; Echo Vétérinaire; La Clinica Veterinaria; Medical Press and Circular; Lancet; Edinburgh Medical Journal; Practitioner; Mark Lane Express; American Live Stock Journal; London Medical Record; Live Stock Journal.*

NEWSPAPERS: *Sussex Express; Cambridge Independent Press; Montreal Daily Star; Melbourne Weekly Times; Irish Times; Madras Mail; Norwich Mercury; Scotsman.*